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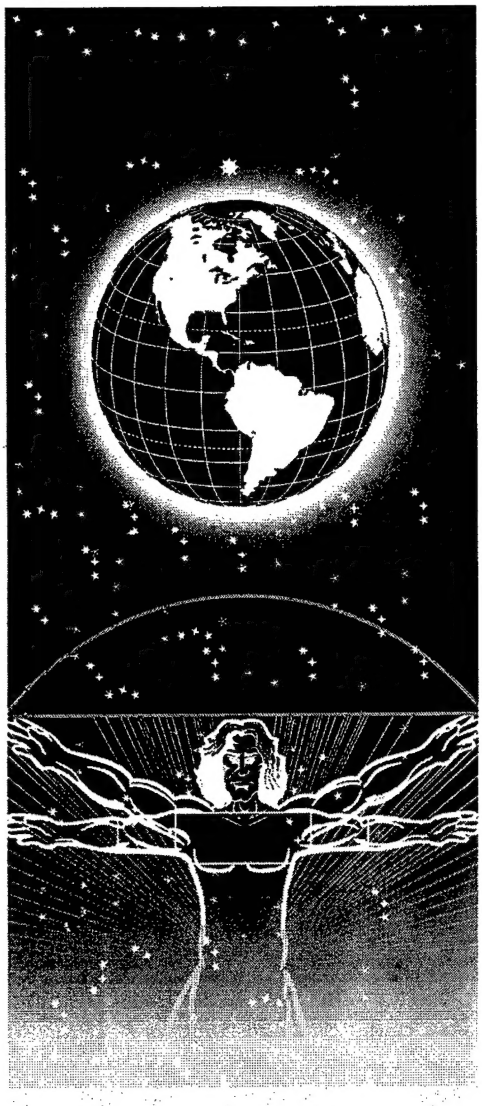

UNITED STATES AIR FORCE RESEARCH LABORATORY

TASK DIFFICULTY MEASUREMENT BY THE UNITED STATES AIR FORCE OCCUPATIONAL MEASUREMENT PROGRAM

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13. ABSTRACT *(Maximum 200 words)*

Task difficulty (TD) data, routinely collected by Occupational Survey Program, assist policy makers in establishing minimum aptitude requirements, determining appropriate grade and training requirements, modifying classification structures, and developing promotion tests. Task difficulty is a generic term used to describe measures of task performance and task learning difficulty. Extensive research conducted during the past 30 years indicated that task difficulty should be defined in terms of task learning difficulty to have reliability, clarity, and utility . Research was needed to identify the error resulting from current procedures, as well as to develop collection procedures which emphasize the learning aspect of TD.

Data were collected from 103 Air Traffic Control (ATC) Senior Noncommissioned Officers using three task factor booklets: TD, task learning difficulty (TLD), and task performance difficulty (TPD). Efforts to determine the reliability, correlation, and validity of the three measures resulted in few significant differences between the data collection methods. TLD appeared to be more reliable due to respondent's consistency and producing fewer divergent raters. TLD data had the greatest correlation to TPD data, perhaps due to the strong learning and performance relationship of ATC tasks. A task level review supports that each survey method measured its projected aspect of difficulty, however the criteria were inadequate and could not substantiate the observations statistically. While further research is necessary, implementation of a TLD survey format would improve the reliability of task difficulty data collection.

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INTRODUCTION

One effective method of enhancing the effectiveness and dealing with problems relating to human resource development and management in organizations is, from a psychological point of view, to understand the behaviors of individuals in the organizations. To understand individual behaviors, it is necessary to first know and understand their jobs. Job analysis is a means for providing this understanding.

Job analysis research and application are relatively recent phenomenon in the world of industrial psychology. Extensive research primarily performed by the United States military has resulted in successful job analysis programs in both the military and civilian sectors. The job analysis program operated by the United States Air Force Occupational Measurement Squadron (USAFOMS) is responsible for providing objective data to aid Air Force managers in making important training and personnel management decisions. To accomplish this mission, a wide array of occupational data are collected and analyzed using the Comprehensive Occupational Data Analysis Program (CODAP) (Christal, 1974). One specific task factor, referred to as "task difficulty," has wide acceptance for such diverse purposes as establishing task training priorities and setting aptitude requirements for jobs. However, because of the current procedures used by USAFOMS in collecting task difficulty data, the reliability and validity of the data being collected are in question, making the topic of USAFOMS's task difficulty data a highly controversial issue in the Air Force community.

Task difficulty (TD) is a generic term used to describe measures of task performance difficulty and task learning difficulty. Research indicates that defining task difficulty in terms of task learning difficulty as opposed to task performance difficulty improves the rating reliability of survey respondents (Cragun & McCormick, 1967; Lecznar, 1971; Mead 1970a; Mead 1970b; Mead & Christal, 1970; Weeks, 1984). The current definition of task difficulty as used by USAFOMS in the United States Air Force (USAF) Occupational Surveys is "the amount of time needed to learn to do a task satisfactorily." However, the lack of clear distinct instructions highlighting this definition in the data collection instrument may be impacting the validity of the data being collected. Respondents may not be providing learning difficulty but perhaps performance difficulty or a variation of both. The current research goals are to identify the magnitude and type of error associated with the current method of task difficulty data collection and to develop a technique to minimize errors resulting from the current task difficulty instructions.

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[1] Revised version of senior author's thesis (Boyce, 1994) written while a member of the USAF Occupational Measurement Squadron, Randolph AFB, Tx. The second author was the supervising professor.

A discussion of task difficulty, as collected and used by the USAF job analysis program, is presented in the following sections. The discussion begins with an overview of job analysis, is followed by descriptions of CODAP and the Air Force job analysis program, and concludes with discussions of the uses, definitions, and data collection and analysis techniques for the task difficulty measures. The sections are organized to flow from a brief account of job analysis to the specific research necessary to validate USAFOMS' definition of task difficulty and to assess the reliability of information being collected.

Job Analysis Overview

Job Analysis serves as the framework for organizational decisions, work and equipment design, and human-resources management. As defined by Jewell (1985), job analysis is a "procedure by which information about job tasks and requirement is obtained through formal methods of data collection and analysis (p. 247)." The results of this procedure provide information about the job itself (work tasks, equipment used), the outcome of worker activities (products made, services performed), working conditions (organizational structure, work schedule), and human requirements (education/training, physical requirements). The end product of a job analysis is used to help organizations carry out a variety of individual, organizational, and research oriented activities, such as employee development, test validation, job classification, personnel recruiting, selection, placement, and training (Cascio, 1991; Jewell, 1985; McCormick & Ilgen, 1985).

Of the several methods available to analyze a job, structured job analysis questionnaires have evolved as the most systematic technique of collecting quantitative information. Position Analysis Questionnaire (PAQ), Functional Job Analysis (FJA), and task inventories are three of the more popular structured questionnaires. A study conducted by Levine, Ash, Hall, and Sistrunk (1983) evaluated the effectiveness and practicality of seven job analysis methods. Though the study found that job analysis methods are perceived as differentially effective for various purposes, in general, the PAQ, FJA, and task inventory-CODAP received consistently high ratings. The PAQ and FJA consists of worker-oriented work activity items, while the task inventory consists of job-oriented work activity items and hence is also referred to as a job inventory.

The PAQ, developed by McCormick, Jeanneret, and Mecham at Purdue University, consists of 194 job elements in six divisions. The six divisions are information input, mental processes, worker output, relationship with others, job context, and other job characteristics. Individual job elements within each of the six groups are rated on appropriate scales, such as possibility of occurrence, importance to the job, amount of time, extent of use, and applicability (Jewell, 1985; McCormick, Jeanneret, & Mecham, 1972). Results of the questionnaire can be used to develop an overall profile of a job in terms of 12 dimensions. The 12 basic job dimensions are indicated in Figure 1. Rather than describing a job in terms of the 194 elements, a job can be described as high or low on such dimensions as "3," performing clerical related activities, "7," performing routine repetitive activities, and "9,"

The 12 Basic Job Dimensions of the Position Analysis Questionnaire

1. Having decision making/communicating/general responsibilities
2. Operating machines and equipment
3. Performing clerical related activities
4. Performing technical related activities
5. Performing service related activities
6. Working regular day versus other work schedules
7. Performing routine repetitive activities
8. Being aware of work environment
9. Engaging in physical activity
10. Supervising/Coordinating other personnel
11. Public and customer related contacts
12. Working in an unpleasant, hazardous, demanding environment

Figure 1. PAQ's 12 Job Dimensions

engaging in physical activities. The final results can then be compared across different jobs. Despite the PAQ's weaknesses, such as having a relatively high reading level with a blue collar orientation and lack of specific work activity descriptions, it has been used successfully in several work settings in many countries (McCormick & Ilgen, 1985).

The FJA procedure, developed by the United States Training and Employment Service (USTES), attempts to identify exactly what the worker does in the job as well as the results of the worker's behavior (Cascio, 1991; Olson, Fine, Myers, & Jennings, 1981; Schmitt & Fine, 1983). Each job is assigned a code that depicts a broad action that summarizes what the worker does in relation to data, people, or things. As shown in Figure 2, tasks are described on a behavior observation worksheet which consists of four general sections: what, why, how, and worker functions. "What" describes what the worker does and to whom or to what. "Why" describes the purpose of the worker's action and "how" describes the tools, equipment, or work aids used to accomplish the task as well as the nature and source of instructions. "Worker functions" describe the orientation and level of worker activity with data, people, and things. Percentages are used to indicate the relative amount of involvement with these functions. These level and orientation measures can be applied to all tasks, and respectively to all jobs. Therefore, the worker function scales provide a way of comparing all tasks and jobs on a common basis. The results are published by the United States Department of Labor in the Dictionary of Occupational Titles (DOT) which serves as a major job information reference source.

During the mid-1930's, DOT was developed by the US Employment Service (USES) in response to the demand of an expanding public employment service for standardized occupational information to support job placement activities. The first edition, published in 1939, contained approximately 17,500 occupations placed into one of 550 occupational groups. Four editions later, the 1991 revision includes standardized, comprehensive descriptions of job duties and related information for 979 occupational groups covering over 20,000 military and civilian occupations or nearly all jobs in the U.S. economy (Dictionary, 1991).

Behavior Observation Worksheet for Functional Job Analysis

Position: _____

Duty: _____

Task Statement: _____

Data	People	Things
0 Synthesize	0 Mentor	0 Set up
1 Coordinate	1 Negotiate	1 Precision Work
2 Analyze	2 Instruct	2 Operate, control
3 Compile	3 Supervise	3 Drive, operate
4 Compute	4 Divert	4 Manipulate
5 Copy	5 Persuade	5 Tend
6 Compare	6 Speak-Signal	6 Feed
	7 Serve	7 Handle
	8 Take instruction	

WHAT		WHY	HOW		WORKER FUNCTIONS		
Performs What Action	To Whom or To What	To Produce or Achieve What	Using What Equipment or Work Aids	Upon What Instructions	Data	People	Things

Figure 2. FJA Behavior Observation Worksheet

The DOT occupational classification system organizes groups of jobs into occupations based on the interrelationships of job tasks and requirements. Each occupation is defined in a systematic fashion. There are seven parts to each occupational definition: 1) Occupational Code Number, 2) Occupational Title, 3) Industry Designation, 4) Alternate Titles, 5) Body of the Definition which includes a lead statement,

task's element statements, and "may" items; 6) Undefined Related Titles, and 7) Definition Trailer. The occupational code number consists of nine digits. The first three digits identify a particular occupational group. The middle three digits are the FJA Worker Functions ratings of the tasks performed in the occupation. The last three digits serve to differentiate occupations. These full nine digits provide each occupation with a unique code which when used in conjunction with the Handbook of Occupational Keywords and Occupational Outlook Handbook, both issued by Department of Labor, are extremely useful for providing a familiarization with the vast array of jobs and terminology associated with each job, for identifying activities and trade requirements of jobs, and for identifying transfer and promotional patterns within particular occupational specialties (Cascio, 1991; Dictionary, 1991).

Task or job inventories typically consist of lists of tasks pertinent to specific occupational areas. In completing an inventory for any given position within an occupational area, a job incumbent or knowledgeable subject matter expert (SME) checks or rates each task according to its application or relationship to the position. The rating may be in accordance with any of several possible rating factors, such as time spent performing the task, judged importance or significance, judged performance difficulty, criticality for training, or the estimated time required to learn to perform. Because the data for individual jobs are expressed in quantitative terms, the results can be subjected to computerized statistical analyses. The Comprehensive Occupational Data Analysis Program (CODAP), for example, is a set of computer programs used to automate, process, organize, and report occupational data. The Levine et al., 1983 study consistently ranked CODAP highly as an effective and practical job analysis method. The specific organizational purposes for which CODAP received high ratings were: job description, job classification, job evaluation, job design, worker training, worker mobility, efficiency/safety, manpower/workforce planning, and legal/quasilegal requirements. CODAP was rated most practical in terms of occupational versatility/suitability, standardization, respondent/user acceptability, operational, reliability, and quality of outcome.

CODAP can be used to group together jobs that have similar tasks or task combinations, resulting in job families that can be used for a number of purposes. Government agencies and large industrial firms have used job inventories-CODAP extensively to develop training programs and performance criteria, as well as validate employee selection programs, job classifications, job descriptions, and job evaluations (Cascio, 1991). The ability to accurately define the composition and content of existing jobs in the United States Air Force is, as stated by Carpenter, Giorgia, and McFarland (1975), a vital prerequisite to the effective operation of the Air Force personnel management system. CODAP provides this capability to the Air Force and her sister services. In addition to being the job analysis standard for the United States and many foreign military services, several universities, industrial organizations, and non-profit organizations have collected occupational data using job inventories and have accomplished their analysis using the CODAP system (Christal, 1974).

CODAP

The most extensive job analysis programs were developed and are operated by governmental agencies. While operational and legal requirements have fostered extensive growth of utilization of job analysis in industry, most of the larger job analysis research and development programs still reside within the government. The Air Force research into the occupational analysis field began in 1956 impacting the growing field of industrial psychology. Specifically, this research led to the development of the Comprehensive Occupational Analysis Program (CODAP). Today, the CODAP system continues to be updated and enhanced by the USAF Armstrong Laboratory (Phalen, Mitchell, & Hand, 1992). Currently available are CODAP programs which can organize and analyze occupational data to answer most of the conceivable questions posed by managers of a personnel system. It is primarily for this reason that all military services in the United States, many allied military services, as well as a number of other government agencies, academic institutions, and some private industries, use CODAP in human resource management (Page & Van De Voort cited in Cascio, 1991; Christal, 1974; Mitchell, 1984).

The evolution of CODAP began with the original version of CODAP simply reporting the time-ranked job descriptions for a specified group of individuals. The second version introduced hierarchical clustering which aided in identifying those types of jobs which actually existed as opposed to those traditionally thought to exist. This technique provides valuable feedback to management of large or geographically separated organizations.

The next major advance in CODAP technology was incorporation of a method of integrating the priorities of supervisors. These priority levels dealt with occupational factors, such as training time to reach proficiency, consequences of inadequate performance, or the criticality of immediate performance. By collecting these ratings from supervisors and processing them with CODAP's interrater reliability program to remove noncooperative raters, a prioritized list can be produced which represents the opinion of supervisors surveyed. Another major advance was the ability to recategorize and summarize the task-level information into higher-level modules more meaningful to managers. Application of this technology has resulted in improved curriculum design and validation.

One of the more recent advances to the system is called profile analysis. This enhancement permits the hierarchical clustering of people or jobs based upon data items of interest. Potential applications include studies of job satisfaction profiles across jobs, clustering jobs to identify job-related requirements, clustering supervisors to determine if different priority policies are at work, and clustering tasks into efficient jobs, jobs into efficient specialties, and specialties into efficient career fields during job description activities (Driskill, 1992; Gould, Archer, Filer, Short, & Kavanagh, 1989; Weber, 1991; Weismuller & Thew, 1979).

CODAP is a dynamic system. It contains over 100 computer programs with the capability of running on several computer systems including Sperry, CDC, and IBM compatible computer equipment. The current package has the ability of processing

20,000 cases of 3,000 task ratings and 8,000 characters of background information per case (Weber, 1991). CODAP technology has made it possible to study jobs on the scale necessary to work with the most critical aspects of Air Force career fields.

Air Force Occupational Measurement Program

The first Air Force operational occupational analysis effort, the Job Specialty Survey Division, was formed in 1967 to apply CODAP technology. Later in 1972, the organization now called the United States Air Force Occupational Measurement Squadron (USAFOMS) was formed at Lackland AFB, Texas. USAFOMS and its occupational analysis program relocated to its current location at Randolph AFB, Texas in 1978.

USAFOMS is the office of primary responsibility for conducting job analysis for Air Force jobs worldwide. The occupational survey process is done in five phases. Phase one is development of the job survey instrument called the USAF Job Inventory. Inventory developers interview subject matter experts to determine the tasks performed in an Air Force Specialty (AFS). From these interviews a comprehensive listing is obtained of all tasks that may be performed by career ladder or job incumbents. This task listing, along with pertinent background questions (job title, equipment operated or maintained, training, etc.) is then published as a USAF Job Inventory. The second phase consists of administering the USAF job inventory to eligible job incumbents to collect "percent members performing," "percent time spent," and "task factor" data. Task factor data, including Task Difficulty (TD) ratings and Training Emphasis (TE) ratings, are collected from experienced senior-level technicians. In phase three, the completed booklets are reviewed and quality controlled to ensure adequate and quality data are being collected. The returned inventories are optically scanned or key-punched by data processing personnel into the computer. In the fourth phase, data are analyzed using a series of CODAP programs and the results are reported in Occupational Survey Reports (OSRs) which summarize findings and implications on enlisted classification, training, and personnel decisions. In phase five, USAFOMS publishes and provides OSRs and related data packages to interested Air Force agencies.

The airman analysis program routinely surveys all Air Force Specialities (AFSs) an average of every five years. With over 250 specialities, approximately 25 specialties or over 70,000 airmen are surveyed each year with results published as Occupational survey reports (OSRs). A typical survey booklet contains roughly between 12 and 20 duties and approximately 500 to 800 tasks (Dubois, 1992). Background items vary among AFS surveys depending on relevant issues effecting the particular specialty. However 12 standard questions are usually always included. These items request such information as paygrade, major command, organizational level, total active military service, time in job, and job satisfaction.

Task inventories satisfy the requirements for a flexible, economical, reliable, and valid procedure for systematically collecting and organizing information for Air Force jobs (Morsh, Madden, & Christal, 1961). Such job analysis information serves as the basis for modification of the existing classification structure and personnel selection techniques, measurement of job difficulty and incumbent performance, and forms the necessary input

for the determination of appropriate job reengineering actions, as well as identification of training requirements, setting of aptitude standards, and job satisfaction research (Carpenter et al., 1975; Christal, 1974).

Task difficulty is a task factor routinely collected by the USAFOMS's occupational measurement program. It plays an integral role in planning for many of Air Force's programs, such as in developing reassignment systems, designing training programs, determining aptitude requirements, and determining grade requirements for positions. Task difficulty's extensive use, despite its relatively recent development, has made it a critical component of Air Force operational and research programs.

Task Difficulty

Utilizations

The information derived from job analysis is fundamental to management information and may be regarded as the keystone of the personnel system of the Air force (Morsh et al., 1961). Possible uses for job analysis results in the USAF are listed in Figure 3. As Morsh et al. described, such information is essential in the measurement of job proficiency, in selection and classification, in development of training curricula, in organizational restructuring, and in improvement of the work environment and job satisfaction.

Task difficulty represents a relatively small but critical portion of job analysis in the Air Force. Mead (1970) proposed several uses of task difficulty data. Following is a list of possible task difficulty applications.

1. Assist in establishing minimum aptitude requirements for positions and classes of positions

2. Compare the difficulty level of work assigned to individuals at various aptitude levels

3. Develop reassignment systems that would insure individuals are assigned jobs of increasing difficulty and responsibility as they progress in their career ladders

4. Determine appropriate grade requirements for positions

5. Compare the difficulty level of work assigned to technical school graduates, individuals bypassing technical school, and individuals receiving Direct Duty Assignments (DDA).

6. Guide decisions about modifications in classification structure.

7. Investigate the interaction between job difficulty, job satisfaction, utilization, and career decisions.

Uses of Job Analysis in the United States Air Force

1. To identify and organize job content for writing and revising standardized specialty descriptions.

2. To establish objective information for job evaluation and to guide or support decisions concerning grade levels, promotion, upgrading, transfer, on-the-job or cross training, or reorganization of work units.

3. To determine job differences and job relationships to be used in structuring and organizing existing Air Force jobs into specialties, officer utilization fields, and airman career fields.

4. To identify the essential features of jobs for the inference of skills, knowledges, and other personal attributes requisite for current Air Force jobs and specialties or for projecting requirements of new tasks, jobs, or specialties.

5. To provide detailed information about current specialties which can be used to identify changes in personnel requirements resulting from the installation of new equipment, tools, or methods of work.

6. To contribute to efficient utilization of individuals and effective career planning and to the projection of the future manpower requirements of the Air Force.

7. To provide essential data to be used in the development of job training standards, course training standards, or for the revision of training curricula.

8. To provide a basis for validating Qualitative Personnel Requirements Information procedures.

9. To improve the matching of men with jobs which will aid in the development of more effective selection and classification devices.

10. To supply current information for the construction of proficiency tests and establishment of work performance standards by determining time required, methods used in performing designated units of work, and other pertinent data.

11. To support work simplification and organizational analysis programs designed to improve work methods, procedures, or equipment furthering efficiency of individual units.

12. To isolate factors which induce job satisfaction, raise morale, or bring about increased effectiveness of individual effort.

13. To locate health and accident hazards and to suggest safety precautions.

Figure 3. Uses of job analysis in the USAF

Several research projects have incorporated task difficulty data. These projects are based on the assumption that task difficulty is based on task learning difficulty. For example in 1972 and 1973, Fugill successfully hypothesized relative task aptitude (level of aptitude required to ensure satisfactory performance of a given task) is conceptually inseparable from relative task difficulty when difficulty is defined in terms of learning time. In the early 1980's, the Air Force Human Resources Laboratory (AFHRL) developed a method to determine minimum aptitude standards for USAF career specialties based on task difficulty and task aptitude benchmarked rating scales. These scales provide a common reference in which to compare tasks from different AFS aptitude areas (Burtch, Lipscomb, & Wissman, 1981; Ramadge, 1987).

An individual's cognitive aptitude for entry and assignment into the Air Force is measured by the Armed Services Vocational Aptitude Battery (ASVAB). Composites of ASVAB subtests are used to establish a person's aptitude for mechanical, administrative, general, and electronics (MAGE) occupational areas and percentile scores are identified for qualification into a specialty job (Ramadge, 1987). The USAF Airmen Classification Structure classifies each specialty by cognitive aptitude area or MAGE type, and a minimum aptitude requirement is assigned to each AFS. Occupational aptitude requirements are critical parameters in personnel procurement, training, utilization, and job attitudes. Prior to this research effort (Burtch, Lipscomb, & Wissman, 1981; Ramadge, 1987), determination of appropriate minimum aptitude requirements for AF specialties was primarily a function of recruiting and training objectives and was established and modified subjectively and unsystematically (Christal, 1974; Fugill, 1972; Weeks, 1984). The minimum aptitude requirement for entry into an AFS is now established by the Air Force Military Personnel Center (AFMPC) using task factor data and CODAP methodologies developed by the AFHRL.

AFHRL's systematic procedure for inferring relative aptitude requirements is referred to as occupational learning difficulty (OLD). OLD is defined as the amount of time it takes to learn an occupation satisfactorily. Three types of occupational information is employed in deriving OLD. Two of the components are task difficulty ratings and task time spent ratings as collected from USAFOMS. The third element involves benchmark rating scales which are designed to capture the range of learning difficulty characteristics of all tasks in an occupational aptitude area (Davis, 1989; Weeks, 1981, 1984). Benchmark ratings of task learning difficulty based on task-anchored benchmark rating scales are comparable across occupations. An OLD index computed by cross multiplying resulting benchmark values by the corresponding percent time spent value yields an average task difficulty per unit time spent (ATDPUTS) index, which are then aggregated across all tasks in the occupation. Thereby, the most difficult AF specialties should have the highest minimum aptitude requirement . Results of these research efforts indicated that aptitude minimums for some specialties were seriously misaligned (Weeks, 1981, 1984). Thus OLD provided the frame of reference for determining aptitude minimums. While previous research conducted by Mumford, Weeks, Harding, and Fleishman (1987) provided evidence of OLD's construct validity, further research into assessing OLD's construct validity is currently in progress (Dickenson, 1991).

Another series of studies integrating task difficulty data relates to automated test outlines (ATOs) developed for AF specialty knowledge test (SKT) construction. In the Air

Force, promotion to the E-5 through E-7 enlisted paygrades in most specialties is determined by an airman's relative ranking in the Weighted Airman Promotion System (WAPS). One of the most critical factors in determining promotion success is SKT scores, a component of WAPS. The SKT is a 100-item multiple choice test designed to measure job knowledge of an AFS. The USAFOMS Test Development Flight (USAFOMS/OMD) is responsible for development of SKTs (Longmire, Phalen, Weismuller & Dittmar, 1988). Although USAFOMS/OMD has maintained a successful test development program since the 1950's, continuing efforts to improve and enhance testing procedures led to a large-scale research effort to develop and validate a methodology for producing occupational data based outlines for SKTs (Phalen, Dittmar, & Weismuller, 1989).

The first step in the ATO process is to predict a subset of USAF Job Inventory tasks which has the highest relevance for testing purposes. A standard weighted regression equation which considers percent members performing, percent time spent, training emphasis, and task difficulty values for each task generates a predicted testing importance (PTI) value for E-5 and E-6/7 tasks. These subsets of tasks are administered to an average of 50 to 70 noncommissioned officers (NCOs) who rate each task on its specialty knowledge testing importance. The resulting field inputs are processed, analyzed, and subsequently used to determine testing importance weight for each task and to calculate test outline weights for each major area (Weismuller, Dittmar, & Phalen, 1988). Efforts to evaluate the ATO process examined the reliability and validity of the primary components using field validated testing importance (FVTI). Task difficulty data exhibited a stronger relationship with FVTI at an E-6/7 level than an E-5 level. This relationship would be expected if task difficulty is assumed to be an estimate of how difficult it is to learn to perform a task and senior experienced personnel perform those tasks which are more difficult to learn (Weismuller et al., 1988). Further research by Dittmar, Weismuller, Haynes, & Phalen (1989) indicated that the development of AFS specific PTI equations might improve predictor efficiency. While research continues, USAFOMS/OMD has successfully implemented the ATO process with SKT development teams and test psychologists showing increasing acceptance of the procedures and products (Phalen, Laskowski, & Williams, 1989).

A final example of research projects, applications, and impact of task difficulty data in the operational Air Force is the development of Automated Training Indicators (ATI). AF Regulation 8-13 requires specialty training standards (STSs) be used to document training requirements for each specialty in terms of tasks required in the specialty and the knowledge and proficiency required to perform the tasks. This document helps standardize on-the-job training (OJT), as well as highlights formal training needed as individuals progress through their career. A course training decision table provides guidance for training decisions, such as development of STSs and other course documents. The table assists training personnel in determining what training is needed and to what depth it should be taught (Fodale & Aslett, 1987). As shown in Figure 4, the course training decision table contains five columns. The first column references the criterion group and percent members performing a given task. The second column addresses TE ratings and the third column addresses TD ratings. High TD ratings suggest tasks which are difficult to learn to perform warrant consideration for centralized training. Tasks rated low in difficulty are considered simple to learn to

perform and are recommended for OJT with no centralized training unless TE ratings or percent members performing data were high. The fourth column examines safety or critical issues. The fifth column provides the resultant training decision. While training development personnel realized the utility of the data, this tabular method was considered to be labor intensive. The need for a better, more organized, and faster approach was in demand Fodale, 1988).

Development of an automated version of the decision logic table resulted in ATI. ATI are CODAP processed numeric values derived from comparisons of percent members performing, TE, and TD ratings for a given AFS similar to the logic of the course training decision table. An ATI value of one through 18 categorizes the task into a type of training ranging from "1" train by OJT with no centralized training to "18" centralize training with task knowledge and performance base. ATI was field tested by USAFOMS analysts and training personnel with favorable results. Use of ATI is now standard policy in USAFOMS' occupational analysis program (Fodale, 1988; Fodale & Aslett, 1987).

The Air Force, as all of the Department of Defense, is undergoing a significant drawdown. The new world environment and national priorities have dictated a reduction in military manpower (Boles, 1992). As the numbers of persons entering the Air Force decrease and complexity and scope of the jobs increase, it becomes exceedingly necessary to make optimal use of whatever manpower is available. Task difficulty serves as an important tool to improve airman's career planning, the assignment system, job grade requirements, and analysis of work. Task difficulty data provide information about the learning burden of tasks that make up Air Force jobs and the ability needed by airmen who perform those tasks. For personnel research, the data are useful in studying the relationship between job satisfaction, reenlistment intent, and utilization of airmen's talents and training.

Definitions

Task difficulty has been defined as "the amount of time needed to learn to do a task satisfactorily." This definition, as well as task difficulty data collection and analysis techniques, is the result of a lengthy stream of research dating back to 1960 (Tartell, 1990). As a result, it is promoted by the Occupational Measurement Program and is the basis of many policies and practices of the USAF, such as those described in the above section.

AUTOMATED TRAINING INDICATOR (ATI) TABLE				
Percent Members Performing	Training Emphasis Ratings	Task Difficulty Ratings	Additional Task Factors	ATI
49.5 to 100	High	3.0 to 9.0	----------	18
		0 to 2.99	Documented Critical or Safety Item	13
49.5 to 100	Above Average	3.0 to 9.0	----------	17
		0 to 2.99	----------	8
49.5 to 100	Mean or Below	3.0 to 9.0	Determine why TE is low	16
		0 to 2.99	----------	6
29.5 to 49.4	High	3.0 to 9.0	Documented Critical or Safety Item	12
		0 to 2.99	Documented Critical or Safety Item	10
29.5 to 49.4	Above Average	3.0 to 9.0	----------	15
		0 to 2.99	----------	5
29.5 to 49.4	Mean or Below	3.0 to 9.0	Determine why TE is low	14
		0 to 2.99	----------	4
0 to 29.4	High	3.0 to 9.0	Documented Critical or Safety Item	11
		0 to 2.99	Documented Critical or Safety Item	9
0 to 29.4	Above Average	3.0 to 9.0	----------	7
		0 to 2.99	----------	3
0 to 29.4	Mean or Below	3.0 to 9.0	----------	2
		0 to 2.99	----------	1

High = 1 Standard Deviation or more above the mean

Above Average = Mean to 1 Standard Deviation above the mean

18 = Task Knowledge and Performance
17 = Task Knowledge and Performance
16 = Task Knowledge and Performance (unless otherwise justified)
15 = Task Knowledge
14 = Task Knowledge (unless otherwise justified)
13 = Task Knowledge and Performance if critical or safety item; if not
ATI 15 if TD $\geq$ 3.0
ATI 8 if TD < 3.0
12 = Task Knowledge and Performance if critical or safety item; if not
ATI 15 if TD $\geq$ 3.0
ATI 8 if TD < 3.0
11 = Task Knowledge and Performance if critical or safety item; otherwise OJT
10 = Task Knowledge if critical or safety item, otherwise OJT
9 = Task Knowledge if critical or safety item, otherwise OJT
8 = Train by OJT
1-7= No Centralized Training

Figure 4. Course Training Decision Table

Task difficulty is a complicated concept and defining it is not a simple matter (Christal, 1974; Madden, 1960). A task may be characterized as difficult because it involves one or more of the following conditions (Madden, 1962).

1. The incumbent was not properly trained to perform the task and this training is not available on the job.

2. Performance standards do not exist or are not clearly defined.

3. Proper tools and equipment are not available or are hard to obtain.

4. The task has emotional aspects which are unpleasant to the incumbent.

5. There is some attribute of the task itself which makes it difficult. It may require intense concentration or vigorous physical exertion.

6. There is some attribute of the environment in which the task is performed which makes it difficult. There may be excessive noise or a requirement for extensive cooperation with other workers.

7. The incumbent does not have the ability to perform the task easily even though other workers generally consider it an easy task.

Difficulty as a task attribute may be defined in as many ways. For instance, the definition may be in terms of the amount of training or experience required to perform a task; it may refer to mental or physical effort; or difficulty may mean complexity or monotony, or something else.

It appears that defining difficulty has presented a general problem of critical significance. One approach to dimensionality of difficulty is to ask incumbents to describe specific tasks that are difficult and then to explain why they are difficult. This method was used in a preliminary study conducted by Madden (1960, 1962). Madden found that when incumbents were asked to list tasks which they found difficult to perform or to learn and to state the reasons why they were difficult, reasons given could be classified into 10 separate categories. Following are the ten categories which resulted:

1. training
2. interpersonal relations
3. frustration
4. pressure
5. attention
6. aptitude
7. working conditions
8. forms
9. regulations, technical publications, manuals
10. unclassified

Examples of reasons tasks were categorized as difficult due to "training" included individuals did not receive any training, did not receive enough training, or changes were occurring so rapidly that training was never completed. The "interpersonal relations" category involved reasons associated with difficulty in receiving or giving supervision, relations with peers, and coordination. The "frustration" category included difficulty reasons relating to lack of proper tools, not enough information, unavailable parts or publications, and waiting. Tasks categorized as "pressure" difficulty included reasons such as insufficient time to do the work properly, responsibility for expensive equipment, or rapid changes that require a great deal of adaptability. "Attention" difficulty type tasks included work that required precision, careful naming or labeling, or was very complicated. Tasks that were considered difficult due to "aptitudes" were a result of individuals lacking the appropriate abilities or skills to complete the task properly. An example might be a draftsman who is unable to draw. Climbing ladders or performing dirty work were examples of the "working conditions" category. "Forms" described the difficulties associated with filling them out, getting information for them, and avoiding errors. Difficulties associated with "regulations, technical publications, and manuals" included finding them, understanding and interpreting them, and conflicting interpretations. Finally, the "unclassified" category encompassed irrelevant statements that were not considered real reasons ("It's hard to do."), reasons which were extremely unusual and unlikely to constitute a component of difficulty having operational implications ("I do not speak English well."), and statements which did not seem to fit into any category in which there were at least one other statement.

Nine of these categories represented different definitions of difficulty, and the majority of them were more related to the work or environmental situation in general than to particular tasks. Basically, the "difficult to perform" reasons were those which could appear in any job and were not produced as a result of any peculiar characteristic of a particular job or task. Similarly, only a few "difficult to learn" reasons could be directly identified as derived from the properties of a task. For instance, insufficient training, interpersonal relations with supervisors and subordinates, frustrating factors (waiting for parts), working conditions, aptitude requirements, and completion of forms constituted a large part of all reasons given. Thus, reported difficulty may stem from environmental conditions, personal characteristics, or some factor inherent in the task itself unless the rating scales explicitly directs the rater's response to a specific domain of difficulty.

One way of using the difficulty attribute is to leave it undefined so the incumbent will identify tasks they judge to be difficult about their jobs, whatever the reason. Although Ammerman (cited in Morsh, Madden, & Christal, 1961), Cragun & McCormick (1967), and Madden (1960, 1962) did this with a small degree of success, difficulty is often perceived differently from task to task by the same individual. For instance, a given incumbent may consider task "A" to be difficult for reason "X," but task "B" may be perceived as difficult for reason "Y." Furthermore, interviews of job incumbents have revealed that the same task may be considered difficult for widely varying and unrelated reasons by different incumbents (Madden, 1960, 1962). Judgements and opinions collected using a global task difficulty concept offers little about the type and rational behind an individual's rating. This information can be misleading and has minimal value. Defining the dimensions of difficulty clearly and accurately and collecting judgements and

opinions regarding specific components of difficulty provide more meaningful information having a higher utility.

Although many definitions were considered, task difficulty was initially defined in terms of mental difficulty and physical difficulty (McCormick & Tombrink, 1960). As Madden's (1960, 1962) research predicted, the test-retest reliability was relatively low and the inter-rater consistency indicated differences existed among incumbents in their perceptions of the difficulty of the various tasks.

During the late 1960's, the Air Force Occupational Program collected data using "Difficulty of Task Performance" and "Difficulty of Learning the Task" relative rating scales (Fugill, 1972; Morsh & Archer, 1967; Weeks, 1984). However, as initially discovered by Madden (1962), senior-level technicians did not perceive task performance difficulty when defined in terms of the difficulty of performing a task satisfactorily under normal conditions as an independent task property but rather as dependent on physical working conditions, experience, and interpersonal relations. As a result, senior-level technicians did not always agree on the relative difficulty of a given task. The alternative was to consider a definition which reflects the amount of time it takes for individuals to learn to perform a task adequately. Numerous studies demonstrated that senior-level technicians could achieve high levels of agreement when rating task on learning difficulty (Cragun & McCormick, 1967; Lecznar, 1971; Mead 1970a, 1970b; Mead & Christal, 1970). For example, Christal (1974) found that while supervisors could not agree on a time it takes for workers to learn to perform tasks; supervisors could agree that if other factors are held constant, workers can learn to perform some tasks faster or slower than other tasks. Thus, task-learning difficulty was defined as the time it takes to learn to perform a task satisfactorily (i.e., the higher the learning difficulty, the more time required to learn to perform the task). As a result, this definition was adopted for the purpose of obtaining judgments of task difficulty. Weeks' 1981 study further supported this task difficulty definition by concluding that "knowledgeable judges can reach high levels of agreement concerning the relative learning difficulty of work tasks when learning difficulty is defined in terms of learning time." Finally, Burtch et al. (1982), again provided evidence in support of the reliability and validity of task-level ratings of learning difficulty. The USAF's current definition of task difficulty as "the amount of time needed to learn to do a task satisfactorily" is supported by this 20-year stream of research.

Data Collection

The USAF method of collecting, analyzing, and reporting task difficulty is relatively complex. The essential rationale and research evidence upon which the existing USAFOMS method has been based are comprehensively reported by Morsh et al. (1961). Morsh and Archer (1967) set forth detailed procedures for collecting, organizing, analyzing, and reporting information describing Air Force jobs. Although the analysis routines have changed significantly during the past 30 years and still continue to evolve, the data collection procedures have remained very stable (Phalen et al., 1992).

The Air Force occupational analysis program is designed specifically for large scale administration and operational application. The basic data in the identification of tasks come from survey data routinely collected at USAFOMS. Initially, the job inventory

used in the periodic occupational surveys of active duty jobs are developed by creating a duty outline and a listing of task statements based on job descriptions, course training standards, and other published materials. Related tasks are then organized within duty categories and the task list is revised based on work-site observations of the job and input from technical specialists. When finalized, the job inventory (JI) is administered to a representative sample of job incumbents within a specialty to collect information about the relative amount of work-time spent on tasks which they perform, using a 9-point scale with descriptive bench marks ranging from "a very small amount" to "a very large amount." Specifically, job incumbents are asked to check the tasks they perform in their present job and then rate those tasks in terms of the relative amount of time spent on that task. Relative time spent means the total time spent doing the task compared with time spent on each of the other tasks performed in the present job. These data are compiled in a computer-generated job description to provide, among other information, an estimation of the percentage of incumbents who perform each task and the average percentage of time spent on each task by those in the specialty who perform it. This same information can be reported for any group of individuals who can be defined by available background variables such as Total Active Federal Military Service (TAFMS), grade, education, and time-in-job. The first two sections of a job inventory, a biographical section and a background section, are used to collect general information about the job incumbent and their job. A representative example of items collected in the biographical and background information data collection sections is located in Appendix A.

The same duty/task list is administered to approximately 75 senior NCOs, usually supervisors, who are asked to rate the tasks on training emphasis (TE), based on how much structured training is required for first-term personnel. Structured training includes training such as basic resident training, formal OJT, and first-term career development courses. TE raters first check tasks requiring structured training and then they recommend the amount of first-term training emphasis needed based on a 9-point scale ranging from "1" indicating extremely low training emphasis to "9" indicating extremely high training emphasis. TE data are important for the determination of initial skills training requirements by aiding decisions about which job tasks should be trained and to what degree.

Another 75 senior NCOs are asked to rate the same duty/task list on task difficulty, based on how much time is required to learn the tasks. The instructions for completing the task difficulty inventories are located in Figure 5. TD raters are asked to first develop a frame of reference for rating task difficulty by scanning the entire list of tasks. Then they are requested to estimate the task difficulty ratings for each task compared with other tasks in the inventory on a 9-point scale ranging from "1" indicating extremely low difficulty to "9" indicating extremely high difficulty. These ratings are used to compute an estimate of the task difficulty of each task compared with other tasks in the inventory. Christal (1974), Mead and Christal (1970), Ruck, Thompson, and Stacy (1987), and Ruck, Thompson, and Thompson (1978) determined task factor values could be reliably obtained from as few as 20 to 40 raters. However, USAFOMS historical records indicate approximately only 60 percent of task factor booklets are returned from a general administration. Accordingly, task difficulty is typically administered to 75 raters.

INSTRUCTIONS FOR RATING TASK DIFFICULTY

As a senior technician, you have been selected to provide needed information pertaining to the difficulty of tasks performed in your career ladder. This information will be of value to the Air Force in the improvement of training, classification, and testing programs. To accomplish this rating, follow the procedure listed below.

NOTE: To obtain the maximum response possible, it is requested that you rate each task of which you have any knowledge. Rate those tasks you presently perform or supervise, those tasks which you have performed at a prior time in your career, and those tasks which you have observed or supervised while being performed by others. Most personnel with your experience and background will be able to rate the majority of the tasks listed and in many cases to rate all of them.

STEP 1. Develop a frame of reference for rating task difficulty. For this survey, task difficulty is defined as the amount of time needed to learn to do each task satisfactorily. To develop a frame of reference, scan the entire listing of tasks. Pick out some easy tasks and some difficult tasks. Then, find some tasks which fall between these extremes that are of average difficulty. Use these tasks at or near the middle of the range as a reference point for judging the difficulty of all tasks in the inventory. This frame of reference will be used for completing STEP 2.

STEP 2. Estimate the task difficulty rating for each task compared with other tasks in this inventory. Use the scale shown here and at the top of each page to rate each task.

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

Begin with the first task in the booklet and give each task of which you have knowledge a difficulty rating from 1 to 9; record the value opposite the task statement in the column titled "TASK DIFFICULTY." Try to rate every task on each page. Remember (from STEP 1) that you are comparing each task with the other tasks in the career field.

STEP 3. The last page of the booklet is available to add any tasks you do now which are not listed. Your constructive suggestions in improving the job inventory will be useful.

STEP 4. Review the booklet to see that you have rated the DIFFICULTY of all tasks possible. Each task can be given only one rating.

Figure 5. Instructions for Rating Task Difficulty

Analysis

These data, once collected, are then analyzed using the Comprehensive Occupational Data Analysis Program. The CODAP programs serve as the basic analytical technique for presenting a job analyst with readily interpretable information on the content of Air Force jobs and specialties. However, the validity of these program's products obviously assume and require accurate input data. To the extent that a subject matter expert cannot provide specific reliable information concerning the correct type of difficulty, errors may occur in the resulting recommendations.

One means of minimizing the effects of inaccurate data is through a CODAP program which identifies and removes divergent raters. A divergent rater is one whose rating behavior demonstrates that the rater did not take the task seriously or one who unintentionally rated improperly, such as one who reverses the meaning of the rating scale. Once divergent raters are identified, they are examined to determine if there are any systematic similarities among them. Similarities may suggest the presence of multiple policies in the AFS. The reliability of a single rater is viewed for the expected correlation between that randomly chosen rater from a sample and another rater randomly chosen from the same sample. The reliability of a composite of raters is the expected correlation between the mean task value for a set of raters drawn from the sample and the average task means of an equivalent set of raters drawn at random from the population of raters from which the sample of raters was drawn. The CODAP GRPREL program tells how many raters of the same type in the sample would be needed to achieve a reliability of a composite of raters that would equal .90. Therefore, when reliability of a composite of raters equals or exceeds .90, it is determined there exists high interrater reliability among raters (Christal & Weismuller, 1976; Goody, 1976).

Another means of minimizing the effects of poor data involves a quality review of incoming data. Specifically the occupational analysts from the Airman Analysis Branch (USAFOMS/OMYO) are responsible for reviewing at a minimum 10 percent of all returned job inventories and 100 percent of all task factor booklets. This quality control procedure is one method of ensuring job incumbents are following instructions for filling out the booklets and that the data look realistic.

The occupational analysts are also responsible for analyzing and making recommendations based on occupational survey data for the enlisted career ladders. Of primary interest, The "1990 OMYO Self-Inspection Checklist" located in the *USAFOMS/OMYO Occupational Analyst Handbook* (1990) and recreated in Figure 6, instructs analysts to "Analyze task difficulty data." Section 4 of the Handbook, "Procedural guide for writing OSRs for Enlisted AFSCs," contains the guidelines for reviewing task difficulty (TD) data when writing the related portions of the OSR . These guidelines provide three questions to be asked by the analyst about tasks with high task difficulty ratings: What are the tasks?; Who performs the tasks?; and Is there a trend?.

The Procedural Guide for Writing OSRs for Enlisted AFSCs:
TD Survey Data

"Objectives: To be able to provide valuable information for decision-makers regarding training decision, we must first gather data that are reliable and analyzable. To this end, we collect secondary task factor data in the form of task difficulty and training emphasis. Each of these collection instruments provide very specific and definitive kinds of data. For example, task difficulty is a measure of how long it takes to learn how to do a particular task.

"Analysis Procedures: The primary purpose of this analysis is to provide information to technical training center personnel which may be used to review and update current training programs. With this in mind, the analyst should leave no stone unturned in his/her search for answers that will support a sound training policy. It is incumbent upon the analyst to use approved statistical techniques, as well as sound judgement in performing the analysis process, based on the data collected. Once the analyst has percent performing data, task factor data, and properly matched the STS and POI, he/she can then compare that information to all pertinent documents."

For the "Task Difficulty" subsection, the following questions should be addressed:

1) What tasks are rated highest in TD?

2) Are the highest rated tasks performed by high percentages of first-term airman, 7-skill level personnel, or both?

3) Is there a pattern found for tasks rated highest in TD?

Figure 6. Task Difficulty Analysis

The Problem

The utility of a technique to determine the difficulty level of Air Force jobs based on a time to learn definition is not in debate. The basic question is whether the task difficulty data currently collected by USAFOMS is in fact "time it takes to learn to perform a task satisfactorily" or are raters providing different interpretations of task difficulty in their ratings?

As shown in Figure 5, the current instructions provided to the NCOs by USAFOMS for rating task difficulty do not emphasize the "learning" dimensionality of task difficulty. The instructions state the definition only once without bold-face or underlining of the term "learning" to highlight or draw attention to this important distinction. Furthermore, the rating scale defined at the top of each task-rating page states only "task difficulty" (see Appendix B). When task difficulty is used without any qualifiers, individuals may think of performance difficulty or how difficult it is to perform the task. In which case, USAFOMS may be essentially providing instructions which collect task

"performance" difficulty or a "global" difficulty rather than "learning" difficulty ratings. If so, improper guidance may be given to training developers and other policy makers. One consequence might be that classification personnel establishing high aptitude requirements for specialties which have tasks that are very hard to complete or perform but whose technical learning requirements are not difficult. While interrater agreement could be high, it only means that raters agreed on difficulty, not that they rated only learning difficulty. Past research clearly indicates "time to learn" is a valid and reliable means of collecting and understanding task difficulty (Burtch et al., 1982; Christal, 1974; Lecznar, 1971; Mead 1970a, 1970b; Mead & Christal, 1970; Weeks, 1981). The concept of task learning difficulty is key to ensuring proper data are collected from the raters. The users of task difficulty information base decisions with the assumption the data measure the task learning difficulty. There is a strong need to know if task difficulty data currently being collected are actually task learning difficulty, and if not, to identify what was being collected, as well as a possible method to ensure future task learning difficulty instructions are clearly understood and accurately reported by subject matter experts.

If the ratings are not "pure" learning difficulty measures, the required corrective actions might be minimal. Re-titling the cover page as Task Learning Difficulty, highlighting and emphasizing the definition and instructions, and titling the scales located at the top of each page as "Task Learning Difficulty" might be sufficient changes. However, these changes may have a serious impact on validity and reliability of both past and future data (Demetriades, Knoll, & Boyce, 1990). Research is required to demonstrate the relationship between task difficulty data, as collected by USAFOMS, and data which emphasize the learning aspect of difficulty.

Therefore, this study investigated a new data collection procedure which modified the current techniques by using a clearer more concise cover page statement, instructions, and difficulty rating scale headings with the expectations that:

1) Significant differences will be identified between different rating methods for the same tasks. Specifically, there will be a significant difference between task learning difficulty and task difficulty/task performance difficulty ratings.

2) Task learning difficulty data will have greater rater reliability because of a more focused definition. That is, task learning difficulty will have fewer divergent raters as well as higher intra- and inter-rater reliability than the other two rating procedures.

3) Task learning difficulty will appear more valid as a measure of learning difficulty through the specificity of its technique and relationship to other task data, such as percent time spent, time functions (seniority and experience of high grade, longer service time, and greater time in career field), and training emphasis of tasks performed by incumbents in their first jobs.

METHOD

The method used to investigate the reliability and validity of task difficulty data was three-fold and similar to the standard procedures currently used to collect task difficulty data. Three equivalent samples of members in an Air Force Specialty (AFS) were surveyed in a single administration. Each rater received one booklet, either the current task difficulty (TD) survey booklet, a new experimental task learning difficulty (TLD) survey booklet, or an experimental task performance difficulty (TPD) booklet. Training emphasis (TE) booklets and job inventory (JI) surveys were also administered to AFS personnel according to standard USAFOMS procedures. Raters had approximately 3 months to complete their survey booklet. As necessary, follow up telephone interviews with a sample of raters were coordinated to obtain subjective estimates of rating scale differences.

Materials

The Air Traffic Control career ladder was selected as the specialty to be used for this study for three reasons. First, the job inventory was in the final stages of completion at the time of this study's initiation. Second, the population size was large enough for administration of the additional survey booklets; and thirdly, the nature of the Air Traffic Control job was considered suitable for investigating task difficulty with results being generalizable to other AF specialties. The Air Force Speciality Code (AFSC) 272X0 Air Traffic Control career ladder job inventory task list, dated June 1992, was provided to senior NCOs. The Job Inventory was prepared by an inventory developer after carefully reviewing pertinent documents, such as previous task lists and training documents. This task list was refined and validated through personal interviews with 34 subject-matter-experts representing five operational bases. This process resulted in a final job inventory containing 514 tasks organized under 10 duty headings.

Three types of difficulty inventory booklets were constructed. One booklet received a brown cover page with the standard "Task Difficulty" title and contained the current instructions and scale headings (see Appendix B). Another inventory used a pink cover page with the revised title, "Task Learning Difficulty," and revised instruction page and scale headings (see Appendix C). The third inventory used a purple cover page with the revised title, "Task Performance Difficulty," and revised instruction page and scale headings (see Appendix D). All three difficulty booklets contained a duplicate page to assess internal consistency or intra-rater reliability. Page 11 (tasks 229 through 252) was chosen for duplication and was located following page 10 and again following page 13 in each task factor booklet (see Appendix E).

Subjects

All eligible senior noncommissioned officers holding a Duty Air Force Specialty Code (DAFSC) 27270 designation were identified using the Uniform Airman Record (UAR), provided by Brooks Air Force Base (AFB) Armstrong Laboratory. The UAR is maintained by the USAF Military Personnel Center (USAFMPC) at Randolph AFB, Texas. From the 1,307 eligible personnel, three lists of 75 names randomly selected by the

computer were generated. Each selectee received either the brown Task Difficulty (TD) inventory, the pink Task Learning Difficulty (TLD) inventory, or the purple Task Performance Difficulty (TPD) inventory. As standard occupational survey procedure, a list of 75 senior NCOs were also computer selected to receive a blue training emphasis (TE) booklet. The job incumbents receiving task factor booklets equate to 26 percent of the total eligible DAFSC 27270 population. Standard procedure also dictates that if an Air Force specialty has a population of less than 3,000 personnel, all eligible members be surveyed. In situations where the population exceeds 3,000 individuals, the analyst, survey developer, and other key personnel determine an appropriate sampling size. Since 4,683 AFSC 272X0 personnel were identified as eligible to participate in the survey, a 50 percent sampling was considered acceptable based on historical data and previous survey experience. Therefore, 2,248 eligible AFSC 272X0 job incumbents were programmed to receive the standard job inventory. The inventories and task factor booklets were mailed to airmen representing all skill levels and all using major commands (MAJCOMs) at 99 installations worldwide.

Distribution of the inventories to job incumbents was carried out between July and November 1992 using the standard occupational survey arrangements with base Consolidated Base Personnel Offices (CBPOs) hosting the airmen. The Occupational Survey Control Officer (OSCO) located at each CBPO is responsible for receiving survey booklets from USAFOMS, administering the survey to job incumbents, collecting the completed surveys, and forwarding the booklets to USAFOMS.

Analyses

Figures 7 through 11 summarize the primary statistical hypothesis tested. First, intrarater reliability was evaluated using a test/retest scenario. The duplicated pages in each booklet provided the data for part of this analysis. The results of the first administration (or first time page 11 was completed) was predicted to correlate highly with the second administration (or the second time the page was completed) in the three survey booklets (see Figure 7). The object of this effort was to ensure an individual used the same logic in identifying difficult tasks, for at least the same task. Higher intrarater reliability was expected for task learning difficulty ratings and was tested by comparing the correlations of TD duplicated tasks, TLD, and TPD duplicated task correlations. Though, the short time between "testing" may effect the results, it will probably err towards increased correlation due to proximity and temporal effects, i.e. Type II error. Next, interrater agreement was measured. The duplicated page (second page 11) was first removed and then CODAP GRPREL program was used to refine the data by identifying and deleting divergent raters using the technique reported by Goody (1976). Differences in the number of divergent raters were examined with the expectations that task learning difficulty will have fewer divergent raters. After refining the data, the degree of interrater agreement between the raters was measured using the intraclass correlation technique described by Lindquist (1953). Because the tasks are rated relative to each other rather than on an absolute scale, Christal and Weismuller's (1976) adjustment option was used to convert each rater's scores to a common mean of 5.0 and a standard deviation of 1.00 (Keeth, 1990). According to Phalen and Albert (1992), adjusted ratings should be used when the raw ratings are believed to represent no more than the position of a task in the scale relative to another with respect to the characteristic in question.

Further, Phalen and Albert determined that adjusted ratings should be used when the only concern is agreement among raters in terms of ranking the tasks. The task factor ratings are treated as relative scales by raters, so analyses were conducted using the standardized rank order scores.

Hypothesis Testing

H_0 : $\rho_{TD1\ TD2} = 0$; no correlation between first page and second duplicate page in TD inventories

H_a: $\rho_{TD1\ TD2} \neq 0$; significant correlation between first page and second duplicate page in TD inventories

H_0 : $\rho_{TLD1\ TLD2} = 0$; no correlation between first page and second duplicate page in TLD inventories

H_a : $\rho_{TLD1\ TLD2} \neq 0$; significant correlation between first page and second duplicate page in TLD inventories

H_0 : $\rho_{TPD1\ TPD2} = 0$; no correlation between first page and second duplicate page in TPD inventories

H_a : $\rho_{TPD1\ TPD2} \neq 0$; significant correlation between first page and second duplicate page in TPD inventories

TD = Task Difficulty
TLD = Task Learning Difficulty
TPD = Task Performance Difficulty

Figure 7. Hypotheses I

Comparisons of each survey was then made. Differences between "task difficulty" and "task learning difficulty" survey data; and "task performance difficulty" and "task learning difficulty" survey data; and "task difficulty" and "task performance difficulty" survey data were examined by comparing tasks within duty areas and across the total survey, as well as creating a simple correlation matrix to examine both raw and standardized rank order task factor data. Due to the common perceptions associated with task difficulty ratings, a small relationship was expected between the data for the three task factor surveys. Hinkle, Wiersma, and Jurs (1979) offer a "Rule of Thumb for interpreting the size of correlation coefficients:

.90 to 1.00	Very high positive correlation
.70 to .90	High positive correlation
.50 to .70.	Moderate positive correlation
.30 to .50	Low positive correlation
.00 to .30	Little if any correlation

While differences were expected to exist between the three task factors (see Figure 8), greater differences were predicted between task difficulty and task learning difficulty

then between task difficulty and task performance difficulty data. This prediction is based on the assumption that the known dimensions, as researched by Madden (1960, 1962), support distinctions between learning and performance difficulty. The lack of clarification in defining the general instructions of task difficulty would incline respondents towards the less specific performance aspect of difficulty when rating tasks (Cragun & McCormick, 1967; Madden, 1960,1962; Morsh, Madden, & Christal, 1961). Interviews with subject matter experts were used to clarify the type of difficulty respondents may have applied in rating the tasks.

Hypothesis Testing

H_0 : $\rho_{TD\ TLD} \geq .70$; high positive correlation between TD and TLD
H_a : $\rho_{TD\ TLD} < .70$; moderate to no correlation between TD and TLD

H_0 : $\rho_{TLD\ TPD} \geq .70$; high positive correlation between TLD and TPD
H_a : $\rho_{TLD\ TPD} < .70$; moderate to no correlation between TLD and TPD

H_0 : $\rho_{TD\ TPD} \geq .70$; high positive correlation between TD and TPD
H_a : $\rho_{TD\ TPD} < .70$; moderate to no correlation between TD and TPD

Figure 8. Hypotheses II

Concerning validation, the most practical method to determine if data from a particular booklet format did in fact measure the learning aspect of task difficulty was to compare it to some criterion. Since no truly adequate criterion was available, a convergent validation paradigm was used. Percent time spent appeared to be a suitable surrogate criterion measure. Percent time spent (PTS) is a relative rating of the amount of time spent performing a task compared with time spent on the other tasks performed in a job. If a task which is more difficult to perform also takes longer to perform, a stronger relationship should exist between TD or TPD and PTS than the relationship between TLD and PTS (see Figure 9).

Although research is limited on this line of reasoning, Madden (1961) found a positive relationship (.82) between the length of time it takes to perform a task and difficulty ratings. More recent research by McCauley, O'Leary, and Rheinstein (1991) found only minimal correlations between 'task difficulty' and time spent performing (.25). The difference might be in the definition assigned to task difficulty. While Madden did not formally provide a definition, McCauley et al. used a learning aspect in their rating scale. Again, in light of the non-conclusive data, the difficulty data were validated using interviews with subject matter experts. Another suitable surrogate criterion is one or more aspects of time: time in the career field, total active military service (TAFMS), grade and skill level. Both Dittmar, Driskill, and Weismuller (1987) and Ruck, Thompson, and Stacy (1987) found that more experienced, higher-grade-level, and senior personnel performed the more difficult tasks. Earlier research by Lecznar (1971) also found a respectable correlation (.70) between mean task difficulty ratings and mean grade level of

incumbents. Stated differently, for individual tasks there is a degree of correspondence between grade level of individuals assigned to perform the tasks and the difficulty (i.e. the time to learn to perform satisfactorily) of the tasks. Higher-grade-level tasks take longer to learn to perform than lower-grade tasks. Therefore, task learning difficulty should have a higher correlation with aspects of the more senior time factors than task difficulty and task performance difficulty (see Figure 10).

Hypothesis Testing

H_0 : $\rho_{TD\ PTS} \leq \rho_{TLD\ PTS}$; lower correlation between TD and percent time spent performing tasks than TLD and PTS

H_a : $\rho_{TD\ PTS} > \rho_{TLD\ PTS}$; higher correlation between TD and percent time spent performing tasks than TLD and PTS

H_0 : $\rho_{TPD\ PTS} \leq \rho_{TLD\ PTS}$; lower correlation between TPD and percent time spent performing tasks than TLD and PTS

H_a : $\rho_{TPD\ PTS} > \rho_{TLD\ PTS}$; higher correlation between TPD and percent time spent performing tasks than TLD and PTS

H_0 : $\rho_{TPD\ PTS} \leq \rho_{TD\ PTS}$; lower correlation between TPD and percent time spent performing tasks than TD and PTS

H_a : $\rho_{TPD\ PTS} > \rho_{TD\ PTS}$; higher correlation between TPD and percent time spent performing tasks than TD and PTS

Figure 9. Hypotheses III

Hypothesis Testing

H_0 : $\rho_{TLD\ TM} \leq \rho_{TD\ TM}$; lower correlation between TLD and senior time factors than TD and time factors

H_a : $\rho_{TLD\ TM} > \rho_{TD\ TM}$; higher correlation between TLD and senior time factors than TD and time factors

H_0 : $\rho_{TLD\ TM} \leq \rho_{TPD\ TM}$; lower correlation between TLD and senior time factors than TPD and time factors

H_a : $\rho_{TLD\ TM} > \rho_{TPD\ TM}$; higher correlation between TLD and senior time factors than TPD and time factors

H_0 : $\rho_{TD\ TM} = \rho_{TPD\ TM}$; no differences between TD and senior time factor correlations and TPD and time factors

H_a : $\rho_{TD\ TM} \neq \rho_{TPD\ TM}$; significant differences between TD and senior time factor correlations and TPD and time factors

Figure 10. Hypotheses IV

The final criterion to be examined was training emphasis. Ruck et al. (1987) found task learning difficulty factors had significant negative correlations with training emphasis, percent members performing first jobs (1-24 months TAFMS), and first job percent time spent. Negative correlations between task learning difficulty and training emphasis are reasonable to expect because tasks recommended for training emphasis for first termers (1-48 months TAFMS) should be those tasks that they routinely perform during their first jobs, not the more difficult tasks in the specialty. Task learning difficulty should then have higher negative correlations with training emphasis for tasks performed by incumbents in their first jobs than task difficulty or task performance difficulty (see Figure 11).

Hypothesis Testing

H_0 : $\rho_{TLD\ TE} \leq \rho_{TD\ TE}$; lower (negative) correlation between TLD and first job training emphasis than TD and TE

H_a : $\rho_{TLD\ TE} > \rho_{TD\ TE}$; higher (negative) correlation between TLD and first job training emphasis than TD and TE

H_0 : $\rho_{TLD\ TE} \leq \rho_{TPD\ TE}$; lower (negative) correlation between TLD and first job training emphasis than TPD and TE

H_a : $\rho_{TLD\ TE} > \rho_{TPD\ TE}$; higher (negative) correlation between TLD and first job training emphasis than TPD and TE

H_0 : $\rho_{TD\ TE} = \rho_{TPD\ TE}$; no differences between TD and first job training emphasis correlations and TPD and TE

H_a : $\rho_{TD\ TE} \neq \rho_{TPD\ TE}$; significant differences between TD and first job training emphasis correlations and TPD and TE

Figure 11. Hypotheses V

RESULTS

Survey Response

The survey response rate for the job inventory and task factor booklets is presented in Table 1.

Table 1. Survey Response Rate

BOOKLET	MAILED	RETURNED	USABLE	PERCENT OF MAILED
Job Inventory (JI)	2,223	1,859	1,637	74%
Task Difficulty (TD)	75	60	52	69%
Task Learning Difficulty (TLD)	75	59	53	71%
Task Performance Difficulty (TPD)	75	63	54	72%
Training Emphasis (TE)	75	62	56	75%

As illustrated in Table 2, the survey sample distribution is representative of the assigned and eligible population across skill levels. The 1,637 respondents represent 35 percent of the eligible and 31 percent of the assigned AFSC 272X0 personnel.

Table 2. Skill Level Representation of Job Inventory Sample

SKILL LEVEL	ASSIGNED [a]		ELIGIBLE [b]		JI SAMPLE	
	Total Assigned	Percent of Assigned	Total Eligible	Percent of Eligible	Total Sample	Percent of Sample
27230	1,046	20%	1,002	21%	343	21%
27250	2,653	51%	2,308	49%	859	52%
27270	1,299	25%	1,168	25%	383	23%
27290	152	3%	140	3%	37	2%
27200	70	1%	65	1%	15	1%
Total	5,220	100%	4,683	99%	1,637	99%

Note. Columns due not add to 100 percent due to rounding.

[a] Assigned Strength as of March 1992

[b] Excludes those in PCS, retirement, discharge, or hospital status; and those with less than 6 weeks on the job

Several critical biographical items were used to identify the groups needed for analyses. The survey sample response rates for these key groups are also displayed in Table 3. As shown, response rates between task factor booklets are highly similar across the four groups: paygrade, skill level, Total Active Federal Military Service (TAFMS), and Time in Career Field (TICF).

Task Factor Reliability

Hypothesis I: Testing for Intrarater Reliability

A Pearson product moment correlation was used to determine the relationship between the same set of tasks which were purposely placed in the booklets twice. Table 4 lists the duplicate tasks and their corresponding correlation coefficient for each task factor. The correlations were significant at $p < .05$ with most at $p < .0001$. The one exception, Task F250 as rated with task performance difficulty (TPD) guidance, was recalculated after removing two divergent raters, Case Control Numbers (CCNs) 18 and 60 , which increased the correlation to r =.7727. A Fisher's z-transformation at .05 level of significance was used to determine if correlations were significant. All duplicate tasks, regardless of method of task factor rating, showed a correlation of greater than or equal to .70. Using a Student's t-test, differences were also noted in the mean correlation for the 24 duplicate tasks. At a .05 level of significance, TPD correlations were lower than TD and TLD correlations (M_{TD} = 0.816, M_{TLD} =0.829, M_{TPD}= 0.738; t_{cv} = 2.02, df = 46). Distribution of the correlations for each task factor identified 22 task learning difficulty (TLD) tasks with correlations greater than .70 versus 21 and 15 tasks with an $r \geq .70$ for task difficulty (TD) and TPD tasks respectively. Hinkle, Wiersma, and Jurs (1979) identified correlations less than .70 as moderate, low, or little as r approached zero.

In order to obtain a minimum of 20 ratings per task, survey respondents were asked to rate all tasks in which they had knowledge, including tasks they currently or previously performed and those tasks they observed or supervised others performing. In some cases, respondents are unable to rate every task due to lack of task knowledge or perhaps lack of comfort with the rating scheme. While all tasks were rated by more than 20 raters, 21 tasks received ratings from over 30 TLD respondents. Similarly, 19 tasks received ratings by over 30 TPD raters, but only five tasks were rated by more than 30 TD raters. A comparison of the mean number of raters for tasks 229 through 252 identified the only significant difference ($p < .05$) was between the mean number of TD raters and TLD raters, M_{TD} = 28.33, M_{TLD} = 32.38, (t_{cv} = 2.02, df = 46). The mean number of TPD raters for the 24 duplicate tasks was 30.13 and was not significantly different from the number of TD or TLD raters.

Table 3. Survey Response Rate by Critical Groups

GROUP	JI SAMPLE	TD SAMPLE	TLD SAMPLE	TPD SAMPLE	TE SAMPLE
PAYGRADE					
E-1/2/3	276				
E-4/5/6	1,158	34	38	36	31
E-7/8/9	203	18	15	18	25
SKILL LEVEL					
27230	343				
27250	859		1		
27270	383	51	51	51	56
27290	37	1	1	2	
27200	15			1	
TAFMS (months)					
1-48	473				
1-24	162				
25-48	311				
49-96	419				
97 +	745	52	53	54	56
97-144	287	7	5	3	6
145-192	216	22	21	20	19
193-240	182	19	23	29	27
241 +	60	4	4	2	4
TICF (months)					
1-24	356		1		
1-48	722		1		
49-96	325	1	2	1	3
97 +	590	51	50	53	53
Total	1,637	52	53	54	56

Table 4. Hypothesis I: Duplicate Task Correlations within Task Factor Booklets

Duplicate Task	TD		TLD		TPD	
	r	n	r	n	r	n
F229	.666	35	.747	37	.783	39
F230	.798	28	.873	31	.755	32
F231	.768	33	.855	34	.549	35
F232	.658	31	.817	34	.673	34
F233	.669	31	.814	33	.828	34
F234	.793	31	.898	34	.590	33
F235	.812	30	.904	34	.789	33
F236	.856	30	.862	34	.774	32
F237	.721	30	.852	34	.760	31
F238	.715	30	.835	34	.748	32
F239	.890	29	.810	33	.767	32
F240	.874	29	.865	34	.919	33
F241	.848	29	.755	33	.739	32
F242	.881	29	.813	34	.856	32
F243	.845	29	.800	34	.861	32
F244	.872	18	.573	21	.518	23
F245	.856	18	.843	25	.601	23
F246	.761	28	.880	31	.779	32
F247	.880	26	.930	33	.805	27
F248	.899	28	.821	33	.623	33
F249	.912	25	.870	29	.694	30
F250	.872	29	.902	33	.262[a]	31
F251	.866	25	.951	31	.663	29
F252	.872	29	.615	34	.858	32

$p = .0001$*

[a] corrected to r =.773

* TLD F244 p = .0066
TPD F231 p = .0006
TPD F234 p = .0003
TPD F244 p = .0114
TPD F245 p = .0024
TPD F250 p = .1545

Interrater Reliability

Similar to CCNs 18 and 60 , 19 task factor raters were identified as unacceptable by the CODAP GRPREL program. As with most studies, reasons raters were deemed as divergent include a high percentage of unrated tasks, a low standard deviation from the same ratings being applied to all tasks, reversal of rating scale, or general non-cooperation. As depicted in Table 5, six raters were removed from the task difficulty sample, one rater from the task learning difficulty sample, and four raters were removed from the task performance difficulty sample. Removal of these raters raised the reliability of composite raters to over .90 which is considered a high interrater reliability (Christal & Weismuller, 1976; Goody, 1976). Using a normal z-test to test differences between two independent proportions, the one TLD divergent rater of the sample of 53 was significantly ($p < .05$; $z_{CV} = 1.96$) less than the six TD divergent raters removed from the sample of 52 TD raters.

Using a student's t-test ($t_{CV} = 1.98$, $p < .05$, df = 1004), no differences were noted between the mean number of raters per task. However several tasks had less than 20 raters, specifically, 67 TD tasks, 25 TLD tasks, and 50 TPD tasks.

Table 5. Descriptive Statistics for Raw and Standardized Task Factors

TASK	RAW			DIVERGENT	STANDARDIZED				MEAN
FACTOR	N	M	SD	RATERS	N	M	SD	R(k,k)	RATERS/TASK
TD	52	5.00	0.88	6	46	5.00	1.00	.941	34.24
TLD	53	5.26	0.91	1	52	5.00	1.00	.955	43.16
TPD	54	4.94	1.11	4	50	5.00	1.00	.960	38.04
TE	56	3.22	2.27	8	48	N/A	N/A	.974	48.00

Task Factor Ratings

Hypothesis II: Testing for Relationships Between Task Factor Ratings

The remaining correlation analysis was completed using the CODAP Curves program which utilizes the Spearman Brown Prophecy formula for rank order data. The task factor correlation matrix with corresponding regression values are displayed in Table 6. A student's t-test ($t_{CV} = 1.684$, df = 44) at a .05 level of significance was used to test the null hypothesis that correlations would be $\geq .70$. The correlations for the task factors ratings were greater than .70. Therefore, the null hypothesis could not be rejected.

Table 6. Hypothesis II: Task Factor Correlation Matrix and Computed R^2 Values

Raw/Standardized	r			R^2		
TASK FACTOR	TD	TLD	TPD	TD	TLD	TPD
TD	-			-		
TLD	.8939	-		.7990	-	
TPD	.8769	.9492	-	.7689	.9009	-

A significant relationship was found using Fisher's z-transformation in testing for differences in independent correlations between $r_{TLD\ TPD}$ and $r_{TD\ TPD}$. Specifically the .9492 correlation between TLD and TPD is significantly higher than the TD and TPD correlation of .8769 at a .05 level of significance ($z_{cv} = 1.96$).

Task Factor Rating Distributions

The distribution of tasks for each task factor is presented in Table 7. Of the 514 tasks, 79 tasks were rated high (M+1SD) by task difficulty raters. Another 345 tasks fell within or slightly below the mean. Similarly, 76 tasks received high task learning difficulty ratings and 355 rated average to slightly below average. Task performance difficulty raters rated 78 tasks as very difficult with 343 falling within the mean or 1 standard deviation below.

Table 7. Distribution of Task Factor Tasks

FACTOR	M+2SD	M+1SD	M	M-1SD	M-2SD	M-3+SD
TD	4	75	186	159	59	20
TLD	13	63	182	173	58	14
TPD	13	65	177	166	66	16

Task Data Comparisons Across Survey Booklet

Tables 8, 9 and 10 list the tasks receiving high (M+1SD) difficulty ratings for Task Difficulty, Task Learning Difficulty, and Task Performance Difficulty respectively. A core of 43 tasks were rated as highly difficult by all three rating strategies. The tasks considered difficult by only one or two rating methods are highlighted. A complete listing of AFSC 272X0 duty titles and task statements are located in Appendix F.

Table 8. All Task Difficulty Tasks > Mean + 1 SD

TASK DIFFICULTY							
TASK	M	TASK	M	TASK	M	TASK	M
B 80	7.15	**I448**	6.15	**C108**	6.04	**B 86**	6.12
F211	7.14	**I452**	6.13	A 8	6.04	**A 20**	6.11
B 81	7.09	**B 84**	6.59	**C102**	6.03	**D165**	6.11
B 94	7.02	C111	6.58	C133	6.29	J494	6.11
B 59	6.99	B 74	6.56	**C118**	6.29	**A 9**	6.10
C131	6.96	I445	6.53	**I467**	6.28	I475	6.09
B 62	6.94	I472	6.51	B 64	6.25	**C106**	6.09
I471	6.94	**B 89**	6.51	J497	6.23	J490	6.08
B 87	6.91	D176	6.45	**D160**	6.23	**C103**	6.08
C110	6.90	**C107**	6.45	J498	6.23	**I473**	6.07
E194	6.87	**C134**	6.44	**C105**	6.20	**B 65**	6.07
I446	6.78	D154	6.43	A 16	6.19	**A 38**	6.07
B 61	6.76	J482	6.42	**C 97**	6.19	F247	6.06
C 98	6.73	J499	6.40	**E200**	6.18	**J492**	6.06
A 37	6.70	A 39	6.39	**B 88**	6.18	**I442**	6.05
B 85	6.66	**C101**	6.36	**E201**	6.17	J500	6.05
C135	6.64	D158	6.36	**I461**	6.17	J495	6.03
C112	6.64	E198	6.33	**E199**	6.16	E188	6.01
D143	6.61	**H418**	6.31	**C104**	6.16	J493	6.01
E186	6.60	A 15	6.30	C132	6.15		

* **Bold Tasks**: Tasks not rated as "high difficulty" by TD, TLD **and** TPD raters (Non-core Tasks)

Table 9. All Task Learning Difficulty Tasks > Mean + 1 SD

TASK LEARNING DIFFICULTY							
TASK	M	TASK	M	TASK	M	TASK	M
C131	7.55	J493	6.79	F211	6.81	B 94	6.43
B 80	7.52	I446	6.74	C110	6.80	**D161**	6.11
J496	7.34	I445	6.68	D176	6.43	**C105**	6.10
J499	7.32	**B 55**	6.67	**A 37**	6.43	J490	6.10
D154	7.32	**J485**	6.66	**C130**	6.42	**J484**	6.08
J500	7.28	J482	6.64	E188	6.38	A 16	6.08
J497	7.19	**J480**	6.60	B 64	6.38	E186	6.05
B 62	7.19	**I442**	6.60	C112	6.36	**E201**	6.05
J498	7.14	**A 9**	6.60	C133	6.34	**J481**	6.04
J495	7.13	**J488**	6.59	C 98	6.33	**C104**	6.04
A 8	7.10	**J487**	6.58	C135	6.31	**I469**	6.04
B 59	7.10	**J478**	6.58	C132	6.28	**I461**	6.03
J494	7.08	B 61	6.58	**J483**	6.21	**D165**	6.03
B 81	6.97	**J486**	6.57	**I452**	6.17	**I451**	6.02
E194	6.97	I472	6.57	**E199**	6.14	F247	6.02
C111	6.90	**I474**	6.57	A 39	6.14	I475	6.01
J502	6.85	**J479**	6.55	D158	6.14	**G362**	6.01
A 15	6.83	**J501**	6.48	**B 65**	6.12		
I471	6.81	E198	6.48	**J503**	6.44		

* **Bold Tasks**: Tasks not rated as "high difficulty" by TD, TLD **and** TPD raters (Non-core Tasks)

Table 10. All Task Performance Difficulty Tasks > Mean + 1 SD

TASK PERFORMANCE DIFFICULTY							
TASK	M	TASK	M	TASK	M	TASK	M
J497	7.39	**J502**	6.84	B 59	6.44	E186	6.16
J498	7.27	**J485**	6.83	I445	6.43	**B 91**	6.16
J495	7.23	C135	6.77	F211	6.43	**A 18**	6.16
J488	7.19	**J479**	6.76	D176	6.42	**D143**	6.15
J496	7.19	J490	6.76	A 16	6.40	**I468**	6.13
J500	7.19	A 8	6.76	C132	6.37	D158	6.11
J494	7.10	J482	6.73	**I469**	6.37	I475	6.10
B 94	7.09	**J483**	6.72	C133	6.35	**B 87**	6.09
J486	7.05	D154	6.69	**A 29**	6.35	**C107**	6.09
J499	7.04	A 15	6.63	**B 55**	6.35	F247	6.08
C131	7.04	**J480**	6.60	B 81	6.34	E198	6.08
J492	7.02	**J478**	6.58	C110	6.33	**B 66**	6.05
J493	7.02	**C134**	6.57	E194	6.32	**I451**	6.03
J501	6.99	**J484**	6.53	C112	6.32	E188	6.02
B 80	6.99	I472	6.53	C 98	6.31	B 74	6.02
J503	6.94	I446	6.48	B 61	6.31	**A 20**	6.02
I471	6.90	B 64	6.47	**J481**	6.28	**A 7**	6.02
J491	6.88	C111	6.46	**B 89**	6.23	**G358**	6.01
J489	6.88	B 62	6.46	A 39	6.18		
J487	6.85	**C130**	6.45	**F265**	6.18		

* **Bold Tasks**: Tasks not rated as "high difficulty" by TD, TLD and TPD raters (Non-core Tasks)

Task Data Comparisons Within Duty Areas

Survey data were also divided into duty areas. Tables 11, 12, and 13 display task factor information across the duty areas. Specifically, Table 11 includes the interrater reliability of ratings for each duty. The task factor interrater reliability for the Duties B and F are high for the three task factors. Duties A, B, D, and F had high TLD and TPD interrater reliability. Duty E had high TLD reliability. The average rater reliability for the remaining duty areas were acceptable, except for TD and TPD Duties I and J and TLD Duty J. Duty Area J also averaged less than 20 raters per task for all three task factors.

Table 11. Interrater Reliability of Raw Task Factors Across Duty Areas

DUTY AREA	TASKS N	TD $R_{(k,k)}$	TD n	TD mean n/tasks	TLD $R_{(k,k)}$	TLD n	TLD mean n/tasks	TPD R(k,k)	TPD n	TPD mean n/tasks
A	47	.855	51	41.3	.952	49	42.4	.937	48	41.8
B	49	.934	42	29.4	.938	47	37.8	.938	46	34.0
C	39	.747	52	38.2	.818	53	43.8	.754	53	40.4
D	50	.812	52	38.9	.905	48	39.9	.920	45	34.2
E	20	.838	50	36.2	.942	51	41.4	.881	52	39.7
F	143	.914	46	41.6	.927	46	43.2	.933	49	44.8
G	59	.767	50	42.7	.822	53	48.6	.621	51	45.0
H	34	.832	45	41.1	.897	43	42.4	.799	51	48.7
I	36	.017	23	18.9	.802	36	26.8	.473	38	25.9
J	26	-.008	21	18.0	-.010	21	18.4	-.133	21	15.2

Table 12. Rank Order of Raw Task Factor Means Across Duty Areas

DUTY	TD rank	TD M	TD SD	TLD rank	TLD M	TLD SD	TPD rank	TPD M	TPD SD
A	7	4.86	.70	7	5.31	.95	5	5.17	.95
B	1	5.51	1.11	4	5.58	.97	3	5.31	1.05
C	2	5.47	.51	3	5.76	.54	2	5.39	.57
D	3	4.99	.60	5	5.37	.73	6	5.12	.81
E	5	4.89	.74	5	5.37	.90	7	4.69	.83
F	10	4.37	.87	10	4.66	.85	9	4.31	.95
G	8	4.77	.48	8	5.20	.48	8	4.47	.46
H	9	4.48	.61	9	4.69	.74	10	4.13	.60
I	6	4.88	.45	2	5.81	.64	4	5.19	.63
J	4	4.90	.19	1	6.65	.32	1	6.45	.18

Duty areas were prioritized by rank ordering task factors by their mean ratings (see Table 12). The scores of each task factor resulted in a different rank order for the 10 duty areas. Task difficulty ratings ranged from $M_{Duty\ B} = 5.51$ to $M_{Duty\ F} = 4.37$. The highest TLD ranking is Duty J ($M_{Duty\ J} = 6.65$) and the lowest is Duty F ($M_{Duty\ F} = 4.66$). TPD ratings ranged from $M_{Duty\ J} = 6.45$ to $M_{Duty\ H} = 4.13$. Several standard deviations are also fairly large, such as 1.05 and 1.11 for TD and TPD Duty B.

A general comparison of tasks rated high for each duty area is listed in Table 13. As shown, several tasks were considered highly difficult (M+1SD) and are common to the three rating schemes.

Task Factors and Criterion Measures

Hypothesis III: Testing for Relationships Between Task Factor Ratings and Percent Time Spent Criteria

A summary of the correlations and regression values for task factor ratings and percent time spent ratings are listed in Table 14. Moderate correlations suggest a relationship of more time spent performing the less difficult tasks and less time spent performing the tasks rated as highly difficult for all three task factor surveys. Using Fisher's z-transformation ($z_{cv} = 1.96$, $p < .05$), no differences were found between the three task factor rating correlations and the total percent time spent ratings, accepting the null hypotheses. The trend of no differences was noted in all percent time spent criterion groups across all factors. Further, higher order regression analysis was also conducted using the CODAP Curves program. Higher order polynomials did not significantly contribute to regression results.

Analyses within criterion groups found lower paygrades, less experienced skill levels, less senior TAFMS, and TICF personnel had significantly higher correlations than their senior more experienced counterparts. The junior, less experienced personnel spend more time performing the less difficult tasks. Two exceptions included TLD and TPD TICF correlations and TPD TAFMS correlations. The top 25 tasks in which the senior criterion groups spend the most amount of time performing and the corresponding rank order of task factor scores are shown in Appendix G.

Hypothesis IV: Testing for Relationships Between Task Factor Ratings and Percent Members Performing Criteria

Using Fisher's z-transformation test for independent correlation comparisons at .05 level of significance, the null hypothesis could not be rejected. Correlations between the different task factors for the percent members performing criterion were not significantly different. Higher order regression analysis, also using the CODAP Curves program, did not significantly improve predictions, R^2. No differences were noted in

relationship with experience or seniority factors either. Correlation details and R^2 values are summarized in Table 15. The 25 tasks performed by the highest percent of criterion group members are shown in Appendix H.

Table 13. Task Factor Tasks > Raw Mean +1 SD in Each Duty Area

DUTY	TD	TLD	TPD
A	**A37**	A15	A15
	A39	A 8	A 8
	A15	**A16**	**A16**
	A38	A 9	A39
	A 8	**A37**	**A29**
	A 9	A39	**A18**
	A29		
	A20		
B	B94	B80	B80
	B59	B81	B94
	B62	**B55**	**B91**
	B87	B62	B81
	B84	**B59**	B62
	B80	**B61**	**B64**
	B85	B94	
	B81		
	B93		
	B74		
	B91		

DUTY	TD	TLD	TPD
C	C131	C131	C131
	C 98	**C111**	**C132**
	C135	**C110**	**C133**
	C110	**C 98**	C135
	C112	C135	**C111**
	C107	**C130**	**C112**
			C130
D	D154	D154	D154
	D143	D176	D176
	D158	D161	D165
	D176	D143	D161
	D160	D158	D158
	D165	D165	D143
	D162		**D162**
	D161		
E	E194	E194	E194
	E186	E198	E198
	E198	**E188**	**E186**
	E200	**E199**	**E188**

* **Bold Tasks** = Tasks not rated as "high difficulty" by TD, TLD, **and** TPD raters (Non-Core Tasks)

Table 13. continued

DUTY	TD	TLD	TPD
F	F211	F211	F211
	F251	**F245**	F247
	F273	F247	F265
	F247	F265	F314
	F245	F317	F317
	F314	F261	F318
	F318	F314	**F275**
	F261	F251	F261
	F317	**F316**	F251
	F272	**F315**	F319
	F319	F249	F249
	F244	F318	**F316**
	F271	**F275**	**F315**
	F240	F307	**F212**
	F307	F273	F273
	F265	**F244**	F248
	F323	**F222**	**F272**
	F249	**F323**	**F240**
	F321	F319	**F309**
	F264	**F264**	**F271**
	F248	F219	F307
	F219	**F217**	F219
	F309	F248	

DUTY	TD	TLD	TPD
G	G398	G362	**G358**
	G401	**G358**	**G396**
	G400	**G361**	**G370**
	G366	**G373**	**G395**
	G362	G351	G400
	G351	**G366**	G398
	G361	**G396**	G351
	G373	G398	**G355**
	G393	G400	G362
		G395	
H	H418	H418	H418
	H412	H430	H430
	H430	H424	H424
	H413	H412	H412
	H424	H413	H413
	H419	H419	H419
I	I471	I471	I471
	I446	I446	I472
	I472	I445	I446
	I445	I472	I445
	I461	**I474**	**I469**
	I473		
J	**J482**	**J500**	**J497**
	J498	**J497**	**J498**
	J494	**J496**	**J488**
	J499	**J495**	**J495**
		J499	**J500**
		J494	**J496**

Table 14. Hypothesis III: Task Factor Correlation with Percent Time Spent and Computed R^2 Values

PTS CRITERION	r			R^2		
	TD	TLD	TPD	TD	TLD	TPD
TOTAL	-.5852	-.5473	-.6165	.3425	.2996	.3801
PAYGRADE						
E-1/2/3	-.5989	-.5398	-.6047	.3587	.2913	.3656
E-4/5/6	-.5889	-.5442	-.6181	.3468	.2961	.3820
E-7/8/9	-.1870	-.2767	-.2779	.0350	.0765	.0772
SKILL LEVEL						
27230	-.6063	-.5424	-.6079	.3676	.2942	.3695
27250	-.5846	-.5355	-.6126	.3417	.2868	.3753
27270	-.4822	-.5032	-.5533	.2325	.2532	.3061
28290	-.0006	-.0995	-.0465	.0000	.0099	.0022
27200	+.0597	-.0200	+.0088	.0036	.0004	.0001
TAFMS (months)						
1-24	-.5966	-.5344	-.5966	.3559	.2856	.3560
1-48	-.6014	-.5435	-.6127	.3617	.2954	.3754
49-96	-.5975	-.5384	-.6170	.3571	.2898	.3806
97+	-.5134	-.5148	-.5708	.2636	.2650	.3259
97-144	-.5644	-.5335	-.6034	.3185	.2846	.3641
145-192	-.5041	-.5019	-.5598	.2541	.2519	.3134
193-240	-.4326	-.4616	-.4976	.1871	.2131	.2476
241 +	-.0412	-.1469	-.1272	.0017	.0216	.0162
TICF (months)						
1-24	-.6024	-.5410	-.6029	.3629	.2927	.3635
1-48	-.6044	-.5456	-.6146	.3653	.2977	.3778
49-96	-.5745	-.5293	-.6116	.3300	.2801	.3741
97+	-.4808	-.4940	-.5449	.2312	.2440	.2969

Table 15. Hypothesis IV: Task Factor Correlation with Percent Members Performing and Computed R^2 Values

PMP	r			R^2		
CRITERION	TD	TLD	TPD	TD	TLD	TPD
TOTAL PMP	.5961	.5705	.6396	.3553	.3255	.4090
PAYGRADE						
E-1/2/3	-.6015	-.5558	-.6189	.3619	.3090	.3830
E-4/5/6	-.5914	-.5613	-.6342	.3497	.3150	.4022
E-7/8/9	-.4935	-.5439	-.5801	.2436	.2958	.3365
SKILL LEVEL						
27230	-.6078	-.5579	-.6247	.3695	.3112	.3903
27250	-.5863	-.5511	-.6265	.3438	.3037	.3925
27270	-.5659	-.5770	-.6337	.3203	.3329	.4016
28290	-.3160	-.4083	-.3769	.0999	.1667	.1420
27200	-.2712	-.3431	-.3655	.0735	.1177	.1336
TAFMS (months)						
1-24	-.6040	-.5531	-.6148	.3648	.3059	.3780
1-48	-.6005	-.5551	-.6226	.3606	.3081	.3877
49-96	-.5942	-.5509	-.6288	.3531	.3035	.3954
97+	-.5702	-.5713	-.6331	.3252	.3263	.4009
97-144	-.5705	-.5526	-.6235	.3255	.3053	.3887
145-192	-.5682	-.5665	-.6285	.3229	.3209	.3950
193-240	-.5555	-.5760	-.6290	.3086	.3318	.3957
241 +	-.4225	-.4949	-.5046	.1785	.2449	.2546
TICF (months)						
1-24	-.6045	-.5574	-.6201	.3654	.3107	.3845
1-48	-.6012	-.5565	-.6250	.3615	.3097	.3906
49-96	-.5817	-.5469	-.6274	.3384	.2991	.3936
97+	-.5630	-.5720	-.6306	.3170	.3272	.3977

Hypothesis V: Testing for Relationships Between Task Factor Ratings and Training Emphasis Criteria

The null hypotheses concerning the strength of relationships between difficulty task factors and tasks receiving high training emphasis which are also performed by at least 30 percent of first job personnel could not be rejected. As shown in Table 16, and supported by a student's t-test (t_{CV} = 1.684, df = 44, α < .05) the correlations were not significantly different from 0. Appendix I lists the TE tasks receiving the highest ratings and shows those performed by at least 50 percent of members in their first job (1-24 months TAFMS). The rank order of the tasks are also included.

Table 16. Hypothesis V: Task Factor Correlation with Training Emphasis of Tasks Performed by First Job Personnel and Computed R^2 Values

CRITERION	r			R^2		
TE	TD	TLD	TPD	TD	TLD	TPD
>30 PMP 1st Job	+.0941	+.1303	+.0087	.0089	.0170	.0001

DISCUSSION

Efforts to establish a new task difficulty collection procedure which would improve the reliability of data and provide more valid measures of difficulty were partially successful. Consistent with previous research which supports the significance of collecting data which emphasize the learning aspect of difficulty, the relationship among task difficulty, task learning difficulty and task performance difficulty was examined. Further comparisons were made to other task data, such as time spent, seniority and experience ratings, and training emphasis factors, to evaluate convergent validity of the three measures of task difficulty. A discussion of these results is presented in the following sequence: brief comments on the survey response rate, discussions of intra- and inter-rater reliability, the relationship between task difficulty factors, and finally remarks about the relationship of task difficulty factors and the criterion measures.

Survey Response

The 60 percent return rate projected by USAFOMS historical records was far exceeded with 74 percent of the mailed job inventories and over 69 percent of the task factor surveys being usable. According to USAFOMS procedures for data collection, both major command (MAJCOM) and skill level distributions must be represented in the survey sample before administration closure. Achieving a mirror distribution of these two groups allows conclusions to be generalized to the entire career field population. Unfortunately, during the survey period, the Air Force was involved with restructuring its major commands. As a result, accurate MAJCOM distribution data were not available. However, as illustrated in Table 2, the survey sample is representative across skill levels. The accuracy of the skill level distribution combined with the high survey return rate support the creditability and the generalizability of the results.

Similar task factor response rates were also necessary to increase the validity of the results. As shown in Table 3, approximately equal numbers of respondents across all experience and seniority groups rated each task factor booklet. As a whole, task factor respondents were AFSC 272X0, 7-skill level, technical or master sergeants (E-6 through E-8), with over 97 months in the career field and 145-240 months of active federal military service.

Task Factor Reliability

Intrarater Reliability

The first task factor reliability objective was to ensure respondents were using the same logic when rating all tasks within their task factor booklet. As expected, correlations between all duplicate tasks were very high. This indicates that within rating scale types, the same thought process was generally used in rating all the tasks; i.e., the ratings are reliable regardless of the type of difficulty rating instruction. Task Learning Difficulty (TLD) and Task Difficulty (TD) raters demonstrated stronger test-retest reliability when compared to Task Performance Difficulty (TPD). The lower correlations between TPD task ratings imply the various aspects of performance difficulty may somewhat impact the

consistency of the thought process when rating several tasks. TPD raters may have more difficulty identifying the reasons tasks are difficult to perform and consistently applying that rating rationale throughout the TPD inventory compared to the TD and TLD inventories.

Several researchers, such as Christal (1974) and Ruck, Thompson, and Thompson (1978), have determined that a minimum of 20 to 40 raters is needed to obtain reliable task factor information. More raters (30 +) increases the likelihood that the data will be usable. While more than 20 respondents rated the 24 duplicate tasks, only five tasks were rated by greater than 30 TD raters. This was significantly less than the 21 tasks rated by 30 TLD respondents. This difference did not impact the results of this study, but in context of future surveys, the greater number of respondents rating tasks as demonstrated by the TLD inventory, may reduce the probability of collecting difficulty data which can not be used because an insufficient number of raters rated the tasks.

Interrater Reliability

The second reliability study objective was to determine the interrater reliability of the task factor data after removing divergent raters. Interrater reliability or R_{kk} was "high" in all three samples and the resulting reliability of any one rating scheme was not more reliable than the others. However, in achieving these high interrater reliabilities, six divergent raters were removed from the TD sample. This was significantly more than the single rater removed from the TLD sample and may indicate that the TD instructions produce more divergent raters.

CODAP GRPREL also has the capability to determine the minimum number of raters that would have been required to establish an R_{kk} of .90. In this study, only 26 TD, 23 TLD, and 19 TPD raters were necessary. Research, as previously mentioned, claims that under normal situations, survey administrators and analysts should budget for a minimum of 20 to 40 raters to ensure rater reliability. The three surveys averaged ratings of over 30 raters per task and easily met this requirement. But on a task level review, approximately 10 percent of the tasks were rated by less than 20 raters in the TD and TPD surveys. TLD respondents only fell below 20 raters on less than 5 percent of the tasks. As eluded to earlier, respondents are not always able to rate every task due to lack of task knowledge or perhaps lack of comfort with the rating scheme. This tendency for TLD sample to include more raters per task as well as less divergent raters per survey minimizes the chance that task factor data will be rejected due to an insufficient number of usable raters.

The TLD survey appears to be a more reliable method for collecting difficulty data. Ratings are more consistent, data have high interrater reliability, fewer divergent raters, and survey tasks have a tendency to be rated by a higher percentage of the raters. These results suggest that guidance and design of the TLD booklet results in the collection of more reliable data.

Relationships Between Task Factor Ratings

As expected, correlation analysis identified a relationship between task factor booklets. Unexpectedly, the correlations were "very high" with the smallest correlation between TD and TPD surveys and the largest between TLD and TPD surveys.

Nearly 80 percent of the TD variance could be explained by the TLD survey and approximately 77 percent could be explained by the TPD ratings. This was surprising since research and expert opinions suggested that the less specific "task difficulty" would consist of aspects of both learning and performance difficulty, with respondents inclining towards rating the performance aspect of difficulty. The lack of a significant difference between TD and TLD versus TD and TPD correlations did not confirm this line of thinking, suggesting maybe the brief reference to task learning difficulty which is included in TD survey instructions may have had some impact on the ratings.

Even more surprising is the significantly greater correlation between TLD and TPD then TD and TPD. Research (Burtch, Lipscomb, & Wissman, 1982; Christal, 1970, 1974; Lecznar, 1971; Madden, 1962; Mead, 1970a, 1970b; Weeks, 1981) has indicated the need to clarify and collect the learning aspect of difficulty because of both increased reliability and understanding and utility of the data. According to the correlational results, respondents rate learning and performance aspects of a task basically the same. Over 90 percent of the variance can be explained between TLD and TPD ratings. Since 10 percent is still unaccounted for, another approach was needed to assess the surveys. The following sections examine tasks which were rated differently under the three survey methods.

Task Factor Distributions

As an aid to the discussion, the practical applications of the survey results should be considered. In determining training and testing needs, USAFOMS advises career field subject matter experts to seriously evaluate tasks with ratings 1 or 2 standard deviations above the mean, i.e., high difficulty tasks, when making personnel management decisions. While tasks with mean ratings or lower should also be reviewed and discussed, tasks with ratings greater than 1 standard deviation below the mean can normally be disregarded. As shown in Table 7, 79 TD, 76 TLD, and 78 TPD tasks meet the high difficulty requirements.

Task Data Comparisons Across Survey Booklet

Of the tasks which were rated "high" on the different difficulty scales, 43 were common to all surveys. Of the remaining tasks, 10 tasks were common to only TD and TLD, 8 common to just TD and TPD, and 19 common to TLD and TPD. This left 19 unique TD tasks, 3 unique TLD tasks, and 9 unique TPD tasks. Following are lists of the unique tasks:

TD: A038 Prepare or submit recommendations for improving or standardizing ATC procedures

	B084	Supervise Air Traffic Control Automated Systems Programming Specialists (AFSC D272X0)
	B085	Supervise Air Traffic Control Managers (CEM 27200)
	B086	Supervise Air Traffic Control Operators (AFSC 27250)
	B088	Supervise Air Traffic Control Technicians (AFSC 27270)
	C097	Administer facility rating examinations or position certifications
	C101	Conduct staff assistance or site visits
	C102	Evaluate activity reports
	C103	Evaluate aircraft save requests
	C106	Evaluate ATC complaints
	C108	Evaluate ATC recommendations
	C118	Evaluate mission impact resulting from ATCALS deficiencies
	D160	Develop resident course curriculum materials
	E200	Prepare OIs
	H418	Authorize simultaneous opposite direction operations
	I442	Compute PAR voltages
	I448	Erect or tear down cantonment facilities
	I467	Plan aircraft loading or unloading
	I473	Review operation orders or plans
TLD:	D161	Direct or implement OJT programs
	I474	Set up disaster control facilities
	G362	Control timed approaches
TPD:	A007	Coordinate air traffic control (ATC) procedures for disaster control exercises with other agencies
	A018	Establish facility mission impact guidelines
	A029	Plan for ATC analysis visits
	B066	Implement cost-reduction programs
	B091	Supervise civilian personnel
	F265	Erect or tear down TRN-41 mobile tactical air navigation system (TACANs)
	G358	Control air traffic using oceanic procedures
	I468	Position mobile ATC equipment or support equipment
	J491	Maintain data bases for automated ATC systems

Several of the unique high TD and TPD tasks were characteristic of certain activities. Specifically, 13 of the 19 tasks or 68 percent of the unique TD tasks are supervisory or managerial activities from Duties A through D: (A: 1, B: 4, C: 7:, D 1). Similarly, five of the 10, or 50 percent, of the unique TPD tasks are also supervisor and managerial duties.

Discussion with a subject matter expert noted tasks rated uniquely high by both TLD and TPD raters, especially those in Duty J were both difficult to learn and to perform. Whereas the tasks unique to TPD, F265 and I468 were relatively easier to learn but physically difficult or cumbersome to perform. These tasks in particular appear to be a variation of the "bolt in the plane" scenario in which the airman is taught that a certain task simply involves switching out black boxes in the plane but because the boxes were

bolted in the plane at an angle very difficult to reach, the task is considered difficult to perform. Similarly, the unique TLD tasks (G362, I474) were considered slightly more involved or harder to learn, but once understood fairly easy to accomplish.

The overlap between TLD and TPD high difficulty tasks is not as easily explained but may be a result of raters rating all and any aspects of difficulty. Of practical concern is the impact of applying these ratings in policy decisions. Specifically, several tasks which were considered difficult to learn, based on TLD ratings, were not captured under the current TD survey guidance as "highly" difficult. Several TD tasks, on the other hand, would have been recommended for inclusion in training and testing documents but are not difficult to learn based on the TLD ratings. This discrepancy is confirmed when tasks are examined by duties.

Task Data Comparisons Within Duty Areas

The survey data were divided into duty areas to examine interrater reliability by duties. In general, reliability was lower and a greater number of divergent raters removed from each duty sample. Importantly, the TLD raters maintained high reliability for five duties versus only four for TPD and two for TD. Further, while two duties had negligible reliability for TD and TPD, only one duty demonstrated poor reliability for TLD. At this more macro level of analysis, TLD again appears to be the more reliable of the rating methods.

Duty areas were placed in rank order of average task factor ratings. The result was a different rank order of duty areas for each difficulty factor. Whereas TD ratings suggest Duty B, Directing and Implementing, and Duty C, Inspecting and Evaluating, are the most difficult. TLD and TPD ratings indicate Duty J, Performing Air Traffic Control Data Programming Functions, and Duty I, Performing Mobile Operations, and Duty C are the most difficult. Duties B, C, I, and J were ranked in the top four duties by both TLD and TPD ratings. The differences with low difficulty levels are minimal with the three survey methods rank ordering Duties G, Performing Radar Functions, Duty H, Perform Control Tower Functions, and Duty F, Performing General Air Traffic Control Functions, as either 8, 9, or 10.

	TD	TLD	TPD
1	B	J	J
2	C	I	C
3	D	C	B
4	J	B	I
5	E	D	A
6	I	E	D
7	A	A	E
8	G	G	G
9	H	H	F
10	F	F	H

The standard deviations per duty area range from .18 (TPD Duty J) to 1.11 (TD Duty B). Most, however, are large enough to impact the rank order of tasks across duties. For example, a highly difficult TPD task in Duty B would rank higher than a highly difficult TPD task in Duty C. This was seen in the representation of several duties in the tasks considered highly difficult in Tables 8, 9, 10.

Comparison of duty area tasks was completed using a technique similar to the method used to compare tasks rated as high (M+1SD) for the three survey booklets. Since Duties B, C, J, and I were rated as the four most difficult duty areas, they were examined first. As shown in Table 13, a total of 17 TD task, 14 TLD tasks, and 14 TPD tasks were not rated as highly difficult by all three rating methods. Nine TD tasks, three TLD tasks, and five TPD tasks received an average rating of at least 1 standard deviation above the mean in the four duty areas by one rating method. Several tasks were common to only two rating methods. Specifically, six tasks were considered difficult by both TLD and TPD raters, five by TD and TLD raters, and three by TD and TPD raters. Review of these tasks or tasks rated as highly difficult by only one or two rating methods found that most were identified earlier in the Task Data Comparisons Across Survey Booklet section.

The unique tasks not identified in the survey level analysis include:

TD:	B087	Supervise Air traffic Control Superintendents (AFSC 27290)
	B093	Supervise Combat Control Operators (AFSC 27350)
	C107	Evaluate ATC problem areas
	I461	Operate site survey equipment
	J482	Build operational programs
TLD:	B055	Direct conventional air route traffic control activities
	B061	Direct radar air route traffic control activities
TPD:	B064	Direct tower instrument flight rules (IFR) approach control activities
	C132	Prepare enlisted performance reports (EPRs) or letters of evaluation (LOEs)
	C133	Prepare recommendations for awards or decorations
	I469	Prepare mission limiting factors
	J488	Configure EARTS hardware systems for operational needs

Since the managerial and supervisory type tasks are difficult to assess in reference to difficulty, only task I 469 and J488 were discussed with a SME. Both tasks were perceived to be more difficult to perform than to learn.

Finally, the least difficult duties were examined for similar trends. Relatively, Duty Areas F, G, and H were rank ordered as the lowest in difficulty, however several tasks within each duty were rated as highly difficult. Most tasks in all three duties were considered difficult by the three rating schemes. Of particular interest was the unique difficult tasks or tasks rated as difficult by only one method:

TD:	F321	Provide wake turbulence separations
	G393	Perform radar equipment turnaround procedures
	G401	Provide radar service for arrivals
TLD:	F217	Approve or coordinate aerial refueling operations
	F222	Approve or coordinate special visual flight rules (SVER) operations
TPD:	F212	Apply visual separations
	G355	Conduct military training route (MTR) operations
	G370	Implement air defense identification zone (ADIZ) procedures

Again, the differences could be explained by the nature of the task and its rating scheme for which it was rated difficult.

In general, results of duty level task comparisons supported the findings of the survey level task comparisons. TLD data had higher interrater reliability across duties and differences in unique tasks within duties were identified as related to the differences in rating schemes. Based on duty means and standard deviations, tasks rated high on learning difficulty were not captured using the current TD survey procedure. Since duty areas are not normally used by decision makers to identify training or testing needs, the practical implication of these differences is minimal. However, the results confirm the need to review historic data to determine if learning difficulty tasks have been omitted during the decision process or if high performance difficulty tasks which are captured under the current procedures were included.

Finally, the practical differences identified in this Air Force Specialty suggests further research is needed to investigate the impact of different difficulty instructions and survey format on task ratings on other specialties. Furthermore, the historical impact of implementing decisions based on tasks considered highly difficult under the current task difficulty collection procedures which includes tasks which were both difficult to learn and difficult to perform needs to be investigated.

Relationship Between Task Factors and Criterion Measures

The effort to use criterion measures to determine the rating logic of respondents and therefore the utility of the current task difficulty format as well as the proposed task learning difficulty survey format was not particularly successful. The relationship of the difficulty ratings with the three key criterion measures: percent time spent, senior time factors, and training emphasis ratings were moderate, were generally in the hypothesized directions, but were not significantly different between the three survey approaches.

Relationship with Percent Time Spent Criteria

Although past research was limited, Madden (1961) and McCauley, O'Leary, and Rheinstein (1991) found positive correlations between task difficulty and percent time spent performing. The current study analyses revealed that the more time individuals

spent on a task, the less difficult the task was rated under all three survey formats. A probable explanation of this phenomenon might be that in this career field, individuals spend a lot of time performing many tasks which with experience become perceived as simple or routine tasks. Examination of the raw data (see Appendix H) indicates that, in general, the high difficult tasks (M + 1SD) or tasks ranked higher than 79 for TD, 76 for TLD, and 78 for TPD were not performed by a high percentage of personnel. Of the top 25 tasks performed by the different paygrade groups, only two tasks received high difficulty ratings from each task factor survey.

Relationship with Percent Members Performing Criteria

The only criterion relationship in the study which somewhat supports the literature (Dittmar, Driskill, & Weismuller, 1987; Ruck, Thompson, & Stacy, 1987) was aspects of time. As demonstrated by the negative correlation between time spent performing and difficulty ratings and the significant difference in correlation of junior and senior time factors, the assumption that less experienced or junior personnel, based on paygrade, skill level, Total Active Federal Military Service (TAFMS), and Time in Career Field (TICF), spend more time on routine less difficult tasks holds true.

Apparently, while junior personnel spend less time on the more difficult tasks and more time on the less difficult tasks, senior personnel are spending a varying amount of time on tasks with varying degrees of difficulty. So while the basic hypothesis involving the difference in the relationship of task factor ratings to these time factors is still not fully supported, the nature of task difficulty rating was somewhat clarified.

Correlations with percent members performing data for the time groups did not add to an understanding of the task difficulty measures. In fact, the lack of significant differences between percent of junior and senior personnel performing tasks indicates that with the moderate correlation, fewer incumbents perform the high difficulty tasks regardless of experience or time in the military or career field. Since it was foreseeable that a curvilinear relationship might exist, a higher order regression analysis was conducted and R^2 computed, but there were no curvilinear relationships present.

Returning to the task-level comparison across duty areas, duties such as I and J as well as the supervisory and managerial functions were ranked as most difficult and are associated with the more experienced and senior personnel. On the other hand, general duties such as F, G, and H were ranked lowest and are primarily considered tasks performed by junior personnel. While the relationship was not significant, the task view approach supports the concept that more difficult tasks are performed by senior personnel. Unfortunately, no generalizations of this relationship can be drawn to explain the differences in the difficulty measures.

Relationship with Training Emphasis Criteria

The negative correlation proposed by Ruck et al. (1987) between training emphasis ratings of tasks performed by at least 30 percent of personnel in their first jobs (1-24 TAFMS) did not exist for this specialty. In fact, no relationship, positive or negative,

was found. Once again, examination of the rank order data (Appendix K) supports an earlier comment proposing that incumbents were not performing a sufficiently high percentage of difficult tasks to make any comparisons.

The lack of a clear relationship between task difficulty factors and the criterion measures and the strong correlations between the different measures of difficulty resulted in an inability to draw conclusions about training emphasis differences among the survey metnods. Further research is necessary with emphasis on measuring difficult tasks performed by a significant number of personnel in a heterogeneous career field to address this issue.

Summary

The three major goals of this research were to increase the reliability of task difficulty data, determine if any differences exist between methods of data collection and identify content differences of the different task difficulty survey procedures. Results indicated that TLD measures were generally more reliable with a higher percentage of raters rating each task, a higher percentage of raters returning usable survey booklets, a lower number of divergent raters, and rating logic consistency. Differences between data collection methods were small but significant with a stronger relationship between TLD and TPD than with TD. The few differences in tasks rated high in difficulty were a result of the type of difficulty used for ratings. Criterion measures collected to validate the ratings provide somewhat inconclusive evidence of the reasons for differences among task difficulty survey methods. So most conclusions that the TLD provides a more accurate measure of the desired task difficulty are based on analyses of the obtained rating data.

The practical impact of these findings suggest that TLD data collection may be more efficient. The TLD procedures require smaller sample sizes, can provide higher reliabilities, yield fewer divergent raters, and result in a larger number of tasks being rated by each rater. Tasks rated high in learning difficulty are not necessarily captured under the current TD format. Advising training and aptitude standards setting personnel to key on the M+1SD tasks may result in poor decisions if the TD survey method was used to collect that data. The lack of a clear criterion to test the validity of difficulty measures creates problems in stating the full utility of the data for establishing personnel policies.

While further research is warranted, personnel at USAFOMS can revise the format of task difficulty surveys to include a new cover page, instructions, and scale headings to emphasize the learning aspect of task difficulty. These changes can be made with confidence that future data will be more reliable and that the validity will be the same, or greater, than data collected in the past.

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APPENDIX A: AFSC 272X0 JOB INVENTORY (JI) BIOGRAPHICAL AND BACKGROUND ITEMS

1) Job Inventory Biographical Items
2) Job Inventory Background Items

JOB INVENTORY BIOGRAPHICAL ITEMS

Last Name, First Initial
Social Security Number
Phone Number
Sex
Grade
Title of Present Job

Number of People You Directly Supervise
Time in Present Job
Time In Career Field
Total Active Federal Military Service (TAFMS)

Primary AFSC
Duty AFSC
Converted AFSC

Organization To Which Assigned
Base To Which Assigned
Command To Which Assigned

JOB INVENTORY BIOGRAPHICAL ITEMS

Assigned in or outside the continental United States
Eligible to reenlist
Eligible for retirement
Job interest
Job utilize your talents
Job utilize your training
Satisfied with sense of accomplishment from work
Plan to reenlist
How assigned to present career ladder
Community College of the Air Force status
Work area where spend most time
Title of present position
Type of facility of present assignment
Formal courses completed
Control tower equipment operated in present job
Navigational aid remote status indicators used in present job
Radar equipment used in present job
Radio communication equipment used in present job
Forms used in present job

APPENDIX B: AFSC 272X0 TASK DIFFICULTY (TD) BOOKLET

1) TD Cover Page
2) TD Instructions
3) TD Scale Headings

UNITED STATES AIR FORCE

TASK DIFFICULTY BOOKLET

AIR TRAFFIC CONTROL

AFSC 272X0

AFPT 90-272-978

JUNE 1992

OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT SQUADRON
AIR TRAINING COMMAND
RANDOLPH AFB, TEXAS 78150-5000

INSTRUCTIONS FOR RATING TASK DIFFICULTY

As a senior technician, you have been selected to provide needed information pertaining to the difficulty of tasks performed in your career ladder. This information will be of value to the Air Force in the improvement of training, classification, and testing programs.

To obtain the maximum response possible, it is requested that you rate each task of which you have any knowledge. Rate those tasks you presently perform or supervise, those tasks which you have performed at a prior time in your career, and those tasks which you have observed or supervised being performed by others. Most personnel with your experience and background will be able to rate the majority of the tasks listed and, in many cases, to rate all of them. To accomplish this rating, follow the procedure listed below.

STEP 1. For this survey, task difficulty is defined as the amount of time needed to learn to do each task satisfactorily. To develop a frame of reference for rating task difficulty, scan the entire listing of tasks. Pick out some easy tasks and some difficult tasks. Then, select some tasks that fall between these extremes which are of average difficulty. Use those tasks at or near the middle of the range as a reference point for judging the difficulty of all tasks in the inventory. Use this frame of reference for completing STEP 2.

STEP 2. Estimate the task difficulty rating for each task compared with other tasks in this inventory. Use the scale shown here and at the top of each page to rate each task.

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

Begin with the first task in the booklet and give each task of which you have knowledge a difficulty rating from 1 to 9; record the value opposite the task statement in the column titled "TASK DIFFICULTY." Try to rate every task on each page. Remember (from STEP 1) that you are comparing each task with the other tasks in the career field.

STEP 3. Add any tasks you believe are performed by members of your specialty and are not covered by the booklet on the last page; then rate them.

STEP 4. Review the booklet to see that you have rated the DIFFICULTY OF ALL TASKS POSSIBLE. Each task can be given <u>only</u> <u>one</u> rating.

TASK DIFFICULTY RATING	AFSC 272X0	Page 1 of 24 Pages

INSTRUCTIONS

Listed below are a duty and the tasks which it includes. Rate each task for difficulty based on time needed to learn to do the job.

TASK DIFFICULTY

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

A. ORGANIZING AND PLANNING	XXXXXXXXXXXXXXXXXX	
1. Assign additional duties		5
2. Assign personnel to duty positions		6
3. Assign sponsors for newly assigned personnel		7
4. Coordinate air traffic control (ATC) procedures for disaster control exercises with other agencies		8
5. Coordinate aircraft control priorities with base flying authorities		9
6. Coordinate airlift operations with other agencies, such as command posts or airlift control centers (ALCCs)		10
7. Coordinate revisions for special operations with base flying authorities		11
8. Coordinate revisions for special operations with host nation or Federal Aviation Administration (FAA) agencies		12
9. Design map overlays		13
10. Determine requirements for space, personnel, equipment, or supplies		14
11. Determine work priorities		15
12. Develop facility reference charts		16
13. Develop organizational charts		17
14. Develop work methods or procedures		18
15. Draft budget or financial requirements		19
16. Establish dispersed controller programs		20
17. Establish facility documentation files		21
18. Establish facility mission impact guidelines		22
19. Establish local procedures for controlling flight check aircraft		23
20. Establish organizational policies, operating instructions (OIs), or standing operating procedures (SOPs)		24
21. Establish performance standards for subordinates		25
22. Establish priorities for restoring equipment		26
23. Establish procedures for controlling traffic between sectors or other facilities		27

APPENDIX C: AFSC 272X0 TASK LEARNING DIFFICULTY (TLD) BOOKLET

1) TLD Cover Page
2) TLD Instructions
3) TLD Scale Headings

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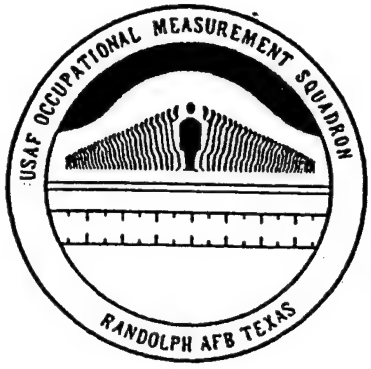


UNITED STATES AIR FORCE

TASK LEARNING DIFFICULTY

AIR TRAFFIC CONTROL

AFSC 272X0

AFPT 90-272-978

JUNE 1992

OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT SQUADRON
AIR TRAINING COMMAND
RANDOLPH AFB, TEXAS 78150-5000

INSTRUCTIONS
FOR RATING TASK LEARNING DIFFICULTY

As a senior technician, you have been selected to provide needed information pertaining to the difficulty of tasks performed in your career ladder. This information will be of value to the Air Force in the improvement of training, classification, and testing programs. To accomplish this rating, follow the procedure listed below.

NOTE: To obtain the maximum response possible, it is requested that you rate each task of which you have any knowledge. Rate those tasks you presently perform or supervise, those tasks which you have performed at a prior time in your career, and those tasks which you have observed or supervised while being performed by others. Most personnel with your experience and background will be able to rate the majority of the tasks listed and in many cases to rate all of them.

STEP 1. Develop a frame of reference for rating task learning difficulty. For this survey, task learning difficulty is defined as ***the amount of time needed to learn to do each task satisfactorily***. To develop a frame of reference, scan the entire listing Pick out some easy tasks and some difficult tasks. Then, find some tasks which fall between these extremes that are of average difficulty. Use these tasks at or near the middle of the range as a reference point for judging the learning difficulty of all tasks in the inventory. This frame of reference will be used for completing STEP 2.

STEP 2. Estimate the task learning difficulty rating for each task compared with other tasks in this inventory. Use the scale shown here and at the top of each page to rate each task.

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

Begin with the first task in the booklet and give each task of which you have knowledge a learning difficulty rating from 1 to 9; record the value opposite the task statement in the column titled "TASK LEARNING DIFFICULTY." Try to rate every task on each page. Remember (from STEP 1) that you are comparing each task with the other tasks in the career field.

STEP 3. The last page of the booklet is available to add any tasks you do now which are not listed. Your constructive suggestions in improving the job inventory will be useful.

STEP 4. Review the booklet to see that you have rated the LEARNING DIFFICULTY of all tasks possible. Each task can be given only one rating.

TASK LEARNING DIFFICULTY RATING	AFSC 272X0	Page 1 of 24 Pages

INSTRUCTIONS

Listed below are a duty and the tasks which it includes. Rate each task for learning difficulty based on time needed to learn to do the job.

TASK LEARNING DIFFICULTY

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

A. ORGANIZING AND PLANNING	XXXXXXXXXXXXXXXXXX
1. Assign additional duties	5
2. Assign personnel to duty positions	6
3. Assign sponsors for newly assigned personnel	7
4. Coordinate air traffic control (ATC) procedures for disaster control exercises with other agencies	8
5. Coordinate aircraft control priorities with base flying authorities	9
6. Coordinate airlift operations with other agencies, such as command posts or airlift control centers (ALCCs)	10
7. Coordinate revisions for special operations with base flying authorities	11
8. Coordinate revisions for special operations with host nation or Federal Aviation Administration (FAA) agencies	12
9. Design map overlays	13
10. Determine requirements for space, personnel, equipment, or supplies	14
11. Determine work priorities	15
12. Develop facility reference charts	16
13. Develop organizational charts	17
14. Develop work methods or procedures	18
15. Draft budget or financial requirements	19
16. Establish dispersed controller programs	20
17. Establish facility documentation files	21
18. Establish facility mission impact guidelines	22
19. Establish local procedures for controlling flight check aircraft	23
20. Establish organizational policies, operating instructions (OIs), or standing operating procedures (SOPs)	24
21. Establish performance standards for subordinates	25
22. Establish priorities for restoring equipment	26
23. Establish procedures for controlling traffic between sectors or other facilities	27

APPENDIX D: AFSC 272X0 TASK PERFORMANCE DIFFICULTY (TPD) BOOKLET

1) TPD Cover Page
2) TPD Instructions and Scale Heading

UNITED STATES AIR FORCE

TASK PERFORMANCE DIFFICULTY

AIR TRAFFIC CONTROL

AFSC 272X0

AFPT 90-272-978

JUNE 1992

OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT SQUADRON
AIR TRAINING COMMAND
RANDOLPH AFB, TEXAS 78150-5000

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

INSTRUCTIONS
FOR RATING TASK PERFORMANCE DIFFICULTY

As a senior technician, you have been selected to provide needed information pertaining to the difficulty of tasks performed in your career ladder. This information will be of value to the Air Force in the improvement of training, classification, and testing programs. To accomplish this rating, follow the procedure listed below.

NOTE: To obtain the maximum response possible, it is requested that you rate each task of which you have any knowledge. Rate those tasks you presently perform or supervise, those tasks which you have performed at a prior time in your career, and those tasks which you have observed or supervised while being performed by others. Most personnel with your experience and background will be able to rate the majority of the tasks listed and in many cases to rate all of them.

STEP 1. Develop a frame of reference for rating task performance difficulty. To develop a frame of reference, scan the entire listing of tasks. Pick out some easy tasks and some difficult tasks. Then, find some tasks which fall between these extremes that are of average difficulty. Use these tasks at or near the middle of the range as a reference point for judging the performance difficulty of all tasks in the inventory. This frame of reference will be used for completing STEP 2.

STEP 2. Estimate the task performance difficulty rating for each task compared with other tasks in this inventory. Use the scale shown here and at the top of each page to rate each task.

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

Begin with the first task in the booklet and give each task of which you have knowledge a performance difficulty rating from 1 to 9; record the value opposite the task statement in the column titled "TASK PERFORMANCE DIFFICULTY." Try to rate every task on each page. Remember (from STEP 1) that you are comparing each task with the other tasks in the career field.

STEP 3. The last page of the booklet is available to add any tasks you do now which are not listed. Your constructive suggestions in improving the job inventory will be useful.

STEP 4. Review the booklet to see that you have rated the PERFORMANCE DIFFICULTY of all tasks possible. Each task can be given only one rating.

APPENDIX E: EXAMPLE OF DUPLICATE PAGE SETUP

1) AFSC 272X0 TPD Page 10
2) AFSC 272X0 TPD Page 11
3) AFSC 272X0 TPD Page 12
4) AFSC 272X0 TPD Page 13
5) AFSC 272X0 TPD Page 11
6) AFSC 272X0 TPD Page 14

TASK PERFORMANCE DIFFICULTY RATING	AFSC 272X0	Page 10 of 24 Pages

INSTRUCTIONS

Listed below are a duty and the tasks which it includes. Rate each task for performance difficulty.

TASK PERFORMANCE DIFFICULTY

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

F.	PERFORMING GENERAL AIR TRAFFIC CONTROL FUNCTIONS	XXXXXXXXXXXXXXXXX
206.	Activate back-up communications systems	72
207.	Adjust radar scopes	07: 73
208.	Annotate and update flight progress strips	5
209.	Apply military assumes responsibility for separation of aircraft (MARSA) procedures	6
210.	Apply mode-c veil procedures	7
211.	Apply nonradar separation procedures	8
212.	Apply visual separations	9
213.	Approve aircraft operations in airport radar surveillance areas (ARSAs)	10
214.	Approve aircraft operations in airport traffic areas (ATAs)	11
215.	Approve aircraft operations in control zones (CZs)	12
216.	Approve aircraft operations in terminal control areas (TCAs)	13
217.	Approve or coordinate aerial refueling operations	14
218.	Approve or coordinate aircraft operations in warning or restricted areas	15
219.	Approve or coordinate enroute altitude reservations	16
220.	Approve or coordinate IFR aircraft departures	17
221.	Approve or coordinate pilot requests for deviations from ATC clearances	18
222.	Approve or coordinate special visual flight rules (SVFR) operations	19
223.	Approve or disapprove flight join-ups	20
224.	Approve parachute, drop zone, or airdrop operations	21
225.	Approve pilot and supervisor of flying (SOF) communications interruptions	22
226.	Approve pilots' request to conduct unusual maneuvers	23
227.	Assign frequencies to aircraft	24
228.	Assign transponder modes or codes	25

TASK PERFORMANCE DIFFICULTY RATING	AFSC 272X0	Page 11 of 24 Pages

INSTRUCTIONS

Listed below are a duty and the tasks which it includes. Rate each task for performance difficulty.

TASK PERFORMANCE DIFFICULTY

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

229.	Authorize or control circling maneuvers	26
230.	Calculate lowest usable flight levels	27
231.	Clean work areas or equipment	28
232.	Complete preduty equipment checklists	29
233.	Conduct alternate facility procedures	30
234.	Conduct briefings on ATC equipment	31
235.	Conduct briefings on ATC operations	32
236.	Conduct communication-out procedures	33
237.	Conduct procedures for opening or closing runways	34
238.	Confirm aircraft altitudes	35
239.	Control aircraft with hot gun or hung ordnance	36
240.	Control no-radio (NORDO) aircraft	37
241.	Control practice precautionary approaches	38
242.	Control receiver-only aircraft	39
243.	Coordinate aircraft handoffs	40
244.	Coordinate allied altitude reservation requests	41
245.	Coordinate altitude reservation conflicts	42
246.	Coordinate hazardous cargo operations	43
247.	Coordinate or control aircraft surge launch and recovery (ASLAR) operations	44
248.	Coordinate or control priority missions	45
249.	Coordinate or control special tactical missions	46
250.	Coordinate or relay SOF requests	47
251.	Coordinate search and rescue operations	48
252.	Coordinate status of ATC facilities with other agencies	49

TASK PERFORMANCE DIFFICULTY RATING	AFSC 272X0	Page 12 of 24 Pages

INSTRUCTIONS

Listed below are a duty and the tasks which it includes. Rate each task for performance difficulty.

TASK PERFORMANCE DIFFICULTY

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

253.	Coordinate use of airspace with other agencies or facilities			50
254.	Coordinate video map alignments			51
255.	Copy or issue airfield advisories			52
256.	Copy or issue field operating conditions			53
257.	Copy or issue meteorological aviation report (METAR) weather reports			54
258.	Copy or relay standard weather observations			55
259.	Copy or transmit enroute clearances using FAA or International Civil Aviation Organization (ICAO) procedures			56
260.	Copy or transmit enroute clearances using host-nation agreement procedures			57
261.	Determine aircraft positions using nonradar procedures			58
262.	Direct or vector aircraft to external store jettison areas			59
263.	Direct or vector aircraft to fuel dumping areas			60
264.	Direct or vector emergency aircraft to alternate airports			61
265.	Erect or tear down TRN-41 mobile tactical air navigation systems (TACANs)			62
266.	Extract information from transmitted flight plans			63
267.	File flight progress strips			64
268.	Formulate IFR clearances			65
269.	Hold arriving VFR aircraft at visual fixes			66
270.	Inform agencies of observed unusual events or incidents			67
271.	Initiate antihijacking procedures			68
272.	Initiate emergency assistance procedures			69
273.	Initiate emergency handling procedures for special operations			70
274.	Initiate requests for control of airspace from other facilities			71
275.	Initiate special control actions for communist aircraft flights			72
276.	Issue advance approach information to arriving aircraft		08:	73

TASK PERFORMANCE DIFFICULTY RATING	AFSC 272X0	Page 13 of 24 Pages

INSTRUCTIONS

Listed below are a duty and the tasks which it includes. Rate each task for performance difficulty.

TASK PERFORMANCE DIFFICULTY

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

277.	Issue aircraft in-flight fuel dumping advisories	5
278.	Issue aircraft speed adjustments	6
279.	Issue alternate clearances	7
280.	Issue altimeter settings	8
281.	Issue altitude assignments	9
282.	Issue bird advisories	10
283.	Issue clearance void times	11
284.	Issue go-around instructions	12
285.	Issue IFR holding instructions	13
286.	Issue low-altitude alerts	14
287.	Issue missed approach instructions	15
288.	Issue traffic advisories	16
289.	Issue wake turbulence advisories	17
290.	Issue warning area advisories	18
291.	Issue weather advisories	19
292.	Issue wheels down advisories	20
293.	Issue wind advisories	21
294.	Make time checks	22
295.	Monitor assigned frequencies	23
296.	Notify agencies of runways in use	24
297.	Operate generators	25
298.	Operate landlines	26
299.	Operate or check remote status indicators	27
300.	Operate or check time announcers	28

TASK PERFORMANCE DIFFICULTY RATING	AFSC 272X0	Page 11 of 24 Pages

INSTRUCTIONS

Listed below are a duty and the tasks which it includes. Rate each task for performance difficulty.

TASK PERFORMANCE DIFFICULTY

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

229.	Authorize or control circling maneuvers	26
230.	Calculate lowest usable flight levels	27
231.	Clean work areas or equipment	28
232.	Complete preduty equipment checklists	29
233.	Conduct alternate facility procedures	30
234.	Conduct briefings on ATC equipment	31
235.	Conduct briefings on ATC operations	32
236.	Conduct communication-out procedures	33
237.	Conduct procedures for opening or closing runways	34
238.	Confirm aircraft altitudes	35
239.	Control aircraft with hot gun or hung ordnance	36
240.	Control no-radio (NORDO) aircraft	37
241.	Control practice precautionary approaches	38
242.	Control receiver-only aircraft	39
243.	Coordinate aircraft handoffs	40
244.	Coordinate allied altitude reservation requests	41
245.	Coordinate altitude reservation conflicts	42
246.	Coordinate hazardous cargo operations	43
247.	Coordinate or control aircraft surge launch and recovery (ASLAR) operations	44
248.	Coordinate or control priority missions	45
249.	Coordinate or control special tactical missions	46
250.	Coordinate or relay SOF requests	47
251.	Coordinate search and rescue operations	48
252.	Coordinate status of ATC facilities with other agencies	49

TASK PERFORMANCE DIFFICULTY RATING	AFSC 272X0	Page 14 of 24 Pages

INSTRUCTIONS

Listed below are a duty and the tasks which it includes. Rate each task for performance difficulty.

TASK PERFORMANCE DIFFICULTY

1. Extremely Low
2. Very Low
3. Low
4. Below Average
5. Average
6. Above Average
7. High
8. Very High
9. Extremely High

301.	Operate or check voice recorders	29
302.	Operationally check automatic terminal information services (ATIS)	30
303.	Participate in preduty familiarization briefings	31
304.	Participate in simulated crash, alert, or disaster control exercises	32
305.	Perform interfacility coordinations	33
306.	Perform intrafacility coordinations	34
307.	Perform meaconing, interference, jamming, and intrusion (MIJI) procedures	35
308.	Perform radar beacon checks	36
309.	Plot altitude reservations	37
310.	Practice facility evacuation procedures	38
311.	Practice security control of air traffic and air navigation aid (SCATANA) procedures	39
312.	Prepare altitude reservation requests	40
313.	Prepare ATIS messages for transmissions	41
314.	Prepare video maps	42
315.	Process airspace reservation amendment delays or cancellations	43
316.	Process ATCALS decommissioning messages	44
317.	Provide or coordinate special controls for air defense intercept missions	45
318.	Provide special handling for aircraft NAVAID flight inspections	46
319.	Provide special handling for special operations aircraft	47
320.	Provide special handling for very important persons (VIPs) or coded aircraft	48
321.	Provide wake turbulence separations	49
322.	Receive or relay enroute air traffic movement information	50
323.	Regulate flow of traffic between sectors or facilities	51
324.	Relay aircraft arrival or departure times	52

APPENDIX F: AFSC 272X0 TASK LIST

INSTRUCTIONS FOR COMPLETING THE DUTY-TASK SECTION

READ THIS PAGE BEFORE GOING FURTHER

Have you completed the Background Information Section?
Make sure, before you continue with this procedure.

PROCEDURE A. CHECKING TASKS OF PRESENT JOB

1. As you read each task in the Duty-Task section, place a check beside each task you perform in your present job. Do not mark tasks you have performed in previous jobs, or tasks you feel you are qualified to perform. Do not confuse work you do yourself with work you supervise. Mark only those tasks you actually perform in your present job. Put your check mark in the column headed "Check-If Done Now". When you have checked ALL tasks performed in your present job, return to this page and follow "Procedure B" below.

2. DO NOT COMPLETE THE RIGHT-HAND COLUMN AT THIS TIME.

3. If a task you perform is not listed anywhere in the entire list, add it on the "Write-In Comments" page at the back of this booklet. Do not add tasks that are classified.

4. Remember, at this time you are to complete only the column headed "Check-If Done Now". Please go to the next page and begin checking those tasks you perform in your present job.

PROCEDURE B. RATING TIME SPENT ON TASKS IN PRESENT JOB

1. Have you checked each task you perform in your present job? Make sure, before you continue with this procedure.

2. Now you are to rate the relative amount of time you spend performing each task in your present job. Relative time spent means the total time you spend doing the task compared with the time you spend on each of the other tasks of your present job.

3. Use a rating of "1" if you spend a "very small amount" of time on a task. Use a rating of "2" for "much below average" time, and so on, up to a rating of "9" if you spend a "very large amount" of time on the task.

4. Remember, you are to rate only those tasks that you have already checked in the "Check-If Done Now" column.

5. Place your rating, according to the 9-point scale, in the right-hand column headed "Time Spent Present Job" by blackening the appropriate circle. When marking your responses, care should be taken not to overlap into other ovals on the same line.

FIGURE 1
Right Way

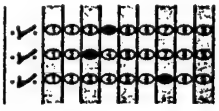
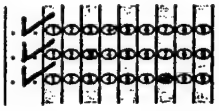


FIGURE 2
Wrong Way



6. When you have completed all your ratings in the right-hand column, you will have completed this USAF Job Inventory and you may turn it in to your Occupational Survey Control Officer.

7. Now, go to the next page and begin rating the "Time Spent" on those tasks you checked previously.

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE AMOUNT
A. ORGANIZING AND PLANNING		
1. Assign additional duties		
2. Assign personnel to duty positions		
3. Assign sponsors for newly assigned personnel		
4. Coordinate air traffic control (ATC) procedures for disaster control exercises with other agencies		
5. Coordinate aircraft control priorities with base flying authorities		
6. Coordinate airlift operations with other agencies, such as command posts or airlift control centers (ALCCs)		
7. Coordinate revisions for special operations with base flying authorities		
8. Coordinate revisions for special operations with host nation or Federal Aviation Administration (FAA) agencies		
9. Design map overlays		
10. Determine requirements for space, personnel, equipment, or supplies		
11. Determine work priorities		
12. Develop facility reference charts		
13. Develop organizational charts		
14. Develop work methods or procedures		
15. Draft budget or financial requirements		
16. Establish dispersed controller programs		
17. Establish facility documentation files		
18. Establish facility mission impact guidelines		
19. Establish local procedures for controlling flight check aircraft		
20. Establish organizational policies, operating instructions (OIs), or standing operating procedures (SOPs)		
21. Establish performance standards for subordinates		
22. Establish priorities for restoring equipment		
23. Establish procedures for controlling traffic between sectors or other facilities		
24. Establish procedures for notifying other agencies of equipment failures		
25. Establish publication libraries		
26. Plan briefings		
27. Plan duty schedules		
28. Plan facility equipment layouts		
29. Plan for ATC analysis visits		
30. Plan layouts of facilities		
31. Plan safety programs		
32. Plan security programs		
33. Plan staff assistance or site visits		
34. Plan work assignments		
35. Prepare facility checklists		
36. Prepare job descriptions		
37. Prepare minimum vectoring altitude (MVA) charts		
38. Prepare or submit recommendations for improving or standardizing ATC procedures		
39. Prepare recommendations for changes to ATC and landing systems (ATCALSs)		
40. Prepare requests for unit detail listing (UDL) changes		
41. Prepare unit emergency plans		
42. Prepare work requests to base service organizations		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE AMOUNT
43. Schedule ATC meetings		
44. Schedule briefings		
45. Schedule flight physicals		
46. Schedule leaves or passes		
47. Schedule navigational aid (NAVAID) flight checks		
B. DIRECTING AND IMPLEMENTING		
48. Approve electrical power transfers		
49. Conduct briefings for newly assigned pilots on ATC policies or procedures		
50. Conduct exercise and contingency briefings to aircrews on local ATC policies or procedures		
51. Conduct facility tours		
52. Conduct staff briefings on status of ATCALSs		
53. Conduct staff meetings		
54. Counsel personnel on personal or military-related problems		
55. Direct conventional air route traffic control activities (ARTCCs)		
56. Direct development or maintenance of status boards, graphs, or charts		
57. Direct ground controlled approach (GCA) activities		
58. Direct maintenance of administrative files		
59. Direct nonradar approach control activities		
60. Direct procedures for performing equipment checks		
61. Direct radar air route traffic control activities		
62. Direct radar approach control (RAPCON) activities		
63. Direct radar final approach control activities		
64. Direct tower instrument flight rules (IFR) approach control activities		
65. Direct tower visual flight rules (VFR) control activities		
66. Implement cost-reduction programs		
67. Implement safety programs		
68. Implement security programs		
69. Implement suggestion programs		
70. Initiate corrective actions based on inspection deficiency reports		
71. Initiate personnel action requests		
72. Interpret ATC policies for using activities		
73. Interpret policies, directives, or procedures for subordinates		
74. Maintain ATC liaison with foreign nationals		
75. Maintain ATC liaison with other United States agencies		
76. Maintain contingency plans		
77. Post duty schedules		
78. Prepare or submit recommendations for changes to ATC publications, other than base		
79. Prepare or submit recommendations for changes to base ATC publications		
80. Prepare or submit terminal instrument procedures (TERPS) packages		
81. Review TERPS packages		
82. Revise facility equipment layouts		
83. Submit changes to flight information publications (FLIP)		
84. Supervise Air Traffic Control Automated Systems Programming Specialists (AFSC D272X0)		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE AMOUNT
85. Supervise Air Traffic Control Managers (CEM 27200)		
86. Supervise Air Traffic Control Operators (AFSC 27250)		
87. Supervise Air Traffic Control Superintendents (AFSC 27290)		
88. Supervise Air Traffic Control Technicians (AFSC 27270)		
89. Supervise Apprentice Air Traffic Control Operators (AFSC 27230)		
90. Supervise Apprentice Combat Control Operators (AFSC 27330)		
91. Supervise civilian personnel		
92. Supervise Combat Control Operators (AFSC 27350)		
93. Supervise Combat Control Technicians (AFSC 27370)		
94. Supervise foreign nationals		
95. Supervise military personnel with AFSCs other than 272X0		
96. Write general correspondence		
C. INSPECTING AND EVALUATING		
97. Administer facility rating examinations or position certifications		
98. Conduct ATC analysis visits		
99. Conduct ATC facility self-inspections		
100. Conduct on-the-job performance evaluations of air traffic controllers		
101. Conduct staff assistance or site visits		
102. Evaluate activity reports		
103. Evaluate aircraft save requests		
104. Evaluate ATC complaints		
105. Evaluate ATC methods or techniques		
106. Evaluate ATC operations reports		
107. Evaluate ATC problem areas		
108. Evaluate ATC recommendations		
109. Evaluate ATC voice-recorder tapes pertaining to aircraft accidents or incidents		
110. Evaluate ATC withdraw packages		
111. Evaluate budget or financial requirements		
112. Evaluate individuals for promotion, demotion, or reclassification		
113. Evaluate inspection reports or procedures		
114. Evaluate job descriptions		
115. Evaluate letters of agreement (LOAs)		
116. Evaluate maintenance or use of workspace, equipment, or supplies		
117. Evaluate memorandums of understanding (MOUs)		
118. Evaluate mission impact resulting from ATCALS deficiencies		
119. Evaluate OIs		
120. Evaluate operations letters		
121. Evaluate procedures for storage, inventory, or inspection of property items		
122. Evaluate safety programs		
123. Evaluate security programs		
124. Evaluate suggestions		
125. Evaluate unit emergency plans		
126. Evaluate work schedules		
127. Evaluate workload requirements		
128. Implement task qualification training (TQT) reports		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE AMOUNT
129. Inventory equipment, tools, or supplies, other than mobile equipment, tools, or supplies		
130. Investigate accidents or incidents, other than aircraft accidents or incidents		
131. Investigate aircraft accidents or incidents		
132. Prepare enlisted performance reports (EPRs) or letters of evaluation (LOEs)		
133. Prepare recommendations for awards or decorations		
134. Write civilian performance ratings or supervisory appraisals		
135. Write staff studies, surveys, or special reports		
D. TRAINING		
136. Administer tests		
137. Assign on-the-job training (OJT) trainers		
138. Assign resident course instructors		
139. Conduct Air National Guard or Air Force Reserves ATC training		
140. Conduct air route traffic control center proficiency training		
141. Conduct ATC exercises		
142. Conduct ATC training for civilian personnel		
143. Conduct ATC training for foreign nationals		
144. Conduct ATCALS equipment training		
145. Conduct briefings on new training techniques		
146. Conduct control tower proficiency training		
147. Conduct facility rating training		
148. Conduct ground control appraoch (GCA) proficiency training		
149. Conduct M-series vehicle training		
150. Conduct OJT		
151. Conduct radar final control proficiency training		
152. Conduct RAPCON proficiency training		
153. Conduct resident course training		
154. Conduct TERPS specialist training		
155. Counsel trainees on training progress		
156. Demonstrate how to locate technical information		
157. Determine resident course training requirements		
158. Develop job qualification standards (JQSs)		
159. Develop JQS training references		
160. Develop resident course curriculum materials		
161. Direct or implement OJT programs		
162. Direct or implement training programs, other than OJT		
163. Establish indoctrination programs for newly assigned personnel		
164. Establish study reference files		
165. Establish unit training requirements		
166. Evaluate individuals for specialized training		
167. Evaluate OJT trainers		
168. Evaluate progress of resident course students		
169. Evaluate training methods or techniques		
170. Maintain training records, charts, or graphs		
171. Operate maintenance management information and control system (MMICS) terminals		
172. Participate in USAF graduate evaluation programs		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE AMOUNT
173. Perform core automated maintenance system (CAMS) duties		
174. Plan OJT		
175. Prepare course control documents		
176. Prepare facility rating guides		
177. Prepare quarterly training reports		
178. Prepare recommendations for standardization of facility procedures		
179. Prepare training schedules		
180. Procure training aids, space, or equipment		
181. Schedule personnel for training		
182. Score tests		
183. Update facility rating suspense files		
184. Write test questions		
185. Write training reports		
E. PERFORMING AIR TRAFFIC CONTROL ADMINISTRATIVE FUNCTIONS		
186. Complete TERPS forms		
187. Implement dispersed controller taskings		
188. Justify manpower authorizations		
189. Maintain facility status boards		
190. Maintain NAVAID status charts		
191. Maintain personnel information cards (PICs)		
192. Maintain records of facility operations		
193. Prepare ATC evaluation record forms		
194. Prepare ATC withdrawal packages		
195. Prepare duty schedules		
196. Prepare FAA facility certification applications		
197. Prepare facility reports		
198. Prepare LOAs		
199. Prepare MOUs		
200. Prepare OIs		
201. Prepare operations letters		
202. Prepare or review service evaluation reports		
203. Prepare security inspection forms		
204. Prepare standardization check forms		
205. Review manpower authorizations		
F. PERFORMING GENERAL AIR TRAFFIC CONTROL FUNCTIONS		
206. Activate back-up communications systems		
207. Adjust radar scopes		
208. Annotate and update flight progress strips		
209. Apply military assumes responsibility for separation of aircraft (MARSA) procedures		
210. Apply mode-c veil procedures		
211. Apply nonradar separation procedures		
212. Apply visual separations		
213. Approve aircraft operations in airport radar surveillance areas (ARSAs)		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE
214. Approve aircraft operations in airport traffic areas (ATAs)		
215. Approve aircraft operations in control zones (CZs)		
216. Approve aircraft operations in terminal control areas (TCAs)		
217. Approve or coordinate aerial refueling operations		
218. Approve or coordinate aircraft operations in warning or restricted areas		
219. Approve or coordinate enroute altitude reservations		
220. Approve or coordinate IFR aircraft departures		
221. Approve or coordinate pilot requests for deviations from ATC clearances		
222. Approve or coordinate special visual flight rules (SVFR) operations		
223. Approve or disapprove flight join-ups		
224. Approve parachute, drop zone, or airdrop operations		
225. Approve pilot and supervisor of flying (SOF) communications interruptions		
226. Approve pilots' request to conduct unusual maneuvers		
227. Assign frequencies to aircraft		
228. Assign transponder modes or codes		
229. Authorize or control circling maneuvers		
230. Calculate lowest usable flight levels		
231. Clean work areas or equipment		
232. Complete preduty equipment checklists		
233. Conduct alternate facility procedures		
234. Conduct briefings on ATC equipment		
235. Conduct briefings on ATC operations		
236. Conduct communication-out procedures		
237. Conduct procedures for opening or closing runways		
238. Confirm aircraft altitudes		
239. Control aircraft with hot gun or hung ordnance		
240. Control no-radio (NORDO) aircraft		
241. Control practice precautionary approaches		
242. Control receiver-only aircraft		
243. Coordinate aircraft handoffs		
244. Coordinate allied altitude reservation requests		
245. Coordinate altitude reservation conflicts		
246. Coordinate hazardous cargo operations		
247. Coordinate or control aircraft surge launch and recovery (ASLAR) operations		
248. Coordinate or control priority missions		
249. Coordinate or control special tactical missions		
250. Coordinate or relay SOF requests		
251. Coordinate search and rescue operations		
252. Coordinate status of ATC facilities with other agencies		
253. Coordinate use of airspace with other agencies or facilities		
254. Coordinate video map alignments		
255. Copy or issue airfield advisories		
256. Copy or issue field operating conditions		
257. Copy or issue meteorological aviation report (METAR) weather reports		
258. Copy or relay standard weather observations		
259. Copy or transmit enroute clearances using FAA or International Civil Aviation Organization (ICAO) procedures		
260. Copy or transmit enroute clearances using host-nation agreement procedures		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE AMOUNT
261. Determine aircraft positions using nonradar procedures		
262. Direct or vector aircraft to external store jettison areas		
263. Direct or vector aircraft to fuel dumping areas		
264. Direct or vector emergency aircraft to alternate airports		
265. Erect or tear down TRN-41 mobile tactical air navigation systems (TACANs)		
266. Extract information from transmitted flight plans		
267. File flight progress strips		
268. Formulate IFR clearances		
269. Hold arriving VFR aircraft at visual fixes		
270. Inform agencies of observed unusual events or incidents		
271. Initiate antihijacking procedures		
272. Initiate emergency assistance procedures		
273. Initiate emergency handling procedures for special operations		
274. Initiate requests for control of airspace from other facilities		
275. Initiate special control actions for communist aircraft flights		
276. Issue advance approach information to arriving aircraft		
277. Issue aircraft in-flight fuel dumping advisories		
278. Issue aircraft speed adjustments		
279. Issue alternate clearances		
280. Issue altimeter settings		
281. Issue altitude assignments		
282. Issue bird advisories		
283. Issue clearance void times		
284. Issue go-around instructions		
285. Issue IFR holding instructions		
286. Issue low-altitude alerts		
287. Issue missed approach instructions		
288. Issue traffic advisories		
289. Issue wake turbulence advisories		
290. Issue warning area advisories		
291. Issue weather advisories		
292. Issue wheels down advisories		
293. Issue wind advisories		
294. Make time checks		
295. Monitor assigned frequencies		
296. Notify agencies of runways in use		
297. Operate generators		
298. Operate landlines		
299. Operate or check remote status indicators		
300. Operate or check time announcers		
301. Operate or check voice recorders		
302. Operationally check automatic terminal information services (ATIS)		
303. Participate in preduty familiarization briefings		
304. Participate in simulated crash, alert, or disaster control exercises		
305. Perform interfacility coordinations		
306. Perform intrafacility coordinations		
307. Perform meaconing, interference, jamming, and intrusion (MIJI) procedures		
308. Perform radar beacon checks		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE
309. Plot altitude reservations		
310. Practice facility evacuation procedures		
311. Practice security control of air traffic and air navigation aid (SCATANA) procedures		
312. Prepare altitude reservation requests		
313. Prepare ATIS messages for transmissions		
314. Prepare video maps		
315. Process airspace reservation amendment delays or cancellations		
316. Process ATCALS decommissioning messages		
317. Provide or coordinate special controls for air defense intercept missions		
318. Provide special handling for aircraft NAVAID flight inspections		
319. Provide special handling for special operations aircraft		
320. Provide special handling for very important persons (VIPs) or coded aircraft		
321. Provide wake turbulence separations		
322. Receive or relay enroute air traffic movement information		
323. Regulate flow of traffic between sectors or facilities		
324. Relay aircraft arrival or departure times		
325. Relay aircraft emergency instruction file information		
326. Relay aircraft messages		
327. Relay aircraft movement information		
328. Relay arresting system information		
329. Relay braking action reports		
330. Relay communications instructions for reports of vital intelligence sightings (CIRVIS)		
331. Relay IFR clearances		
332. Relay information for issuance of notices to airmen (NOTAMs)		
333. Relay information from FLIP		
334. Relay notices of overdue aircraft		
335. Relay notifications of ground missile emergencies		
336. Relay runway condition readings (RCRs)		
337. Relay runway visibility value (RVV) readings		
338. Relay runway visual range (RVR) readings		
339. Replace voice recorder tapes		
340. Request aircraft position information		
341. Request ATCALS flight checks		
342. Request or relay clearances for landings using light or voice systems		
343. Request pilot reported (PIREP) in-flight weather conditions		
344. Reroute aircraft around military operations areas (MOAs)		
345. Transfer arriving or departing aircraft to other facilities		
346. Update flight data on automated data systems		
347. Vector aircraft		
348. Verify altimeter settings		
G. PERFORMING RADAR FUNCTIONS		
349. Apply final approach course intercept procedures		
350. Apply merging target procedures		
351. Apply no-gyro procedures		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE AMOUNT
352. Apply radar contact lost procedures		
353. Approve or issue radar pointouts		
354. Authorize visual separations between IFR arrivals or departures		
355. Conduct military training route (MTR) operations		
356. Confirm aircraft identifications		
357. Construct voice imprint files on personal computer (PC) radar simulators		
358. Control air traffic using oceanic procedures		
359. Control airport surveillance radar approaches (ASRs)		
360. Control instrument approaches		
361. Control precision radar approaches (PARs)		
362. Control timed approaches		
363. Coordinate aircraft movement and identification information with air defense facilities		
364. Coordinate aircraft position with tower or runway supervisory units (RSUs)		
365. Coordinate and relay observed radar weather with other agencies		
366. Coordinate approach or landing sequences		
367. Forward airport lighting requests to control towers		
368. Identify aircraft using beacon methods		
369. Identify aircraft using primary radar methods		
370. Implement air defense identification zone (ADIZ) procedures		
371. Inform aircraft of radar identification status		
372. Initiate PC radar simulator sessions		
373. Initiate special radar actions during electronic combat activities		
374. Initiate T-4 radar simulator sessions		
375. Interpret radar beacon displays		
376. Issue approach clearances		
377. Issue climbout instructions		
378. Issue decision height (DH) advisories		
379. Issue entry or exit clearances to special use airspace		
380. Issue minimum descent altitude (MDA) advisories		
381. Issue radar surveillance approach recommended altitudes		
382. Monitor special use airspace		
383. Operate pseudopilot consoles		
384. Operate special circuits		
385. Operationally check or adjust decision height lines on radar indicators		
386. Operationally check or adjust equipment alignment voltages		
387. Operationally check or adjust remote line amplifiers (RLAs)		
388. Operationally check primary radars		
389. Operationally check radar antenna tilt meters		
390. Operationally check radar reflector displays		
391. Operationally check secondary radars		
392. Perform map overlay adjustments		
393. Perform radar equipment turnaround procedures		
394. Perform radar handoffs		
395. Program scenarios for PC radar simulators		
396. Program T-4 radar simulator tapes		
397. Provide radar advisories to VFR aircraft		
398. Provide radar assistance to emergency aircraft		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE AMOUNT
399. Provide radar monitoring of instrument approaches		
400. Provide radar separation procedures		
401. Provide radar service for arrivals		
402. Provide radar service for departures		
403. Provide stage radar services		
404. Recognize or report radar malfunctions		
405. Relay enroute aircraft position estimates		
406. Select radar beacon presentations		
407. Track or flight-follow unmanned, suspect, or derelict airborne objects		
H. PERFORMING CONTROL TOWER FUNCTIONS		
408. Activate emergency evacuation alarm systems		
409. Activate primary crash alarm systems		
410. Adjust brite radar systems		
411. Advise pilots of observed abnormal aircraft conditions		
412. Apply reduced runway separation criteria		
413. Apply terminal separation procedures		
414. Approve clearance for aircraft or vehicle operations in NAVAID critical areas		
415. Assign runways for landings or takeoffs		
416. Authorize intersection takeoffs		
417. Authorize operations in visual blind spots		
418. Authorize simultaneous opposite direction operations		
419. Authorize simultaneous same direction operations		
420. Authorize VFR departures		
421. Clear movement areas for emergency vehicle operations		
422. Control aircraft using light gun signals		
423. Control helicopter operations		
424. Control simulated flameout (SFO) approaches		
425. Control taxiing aircraft		
426. Control vehicles, equipment, or personnel on movement areas using radios or light gun signals		
427. Coordinate aircraft maintenance engine runups		
428. Coordinate or conduct hydrazine procedures		
429. Coordinate runway changes		
430. Establish landing sequences		
431. Issue takeoff or landing clearances		
432. Maintain surveillance of airport movement or traffic areas		
433. Make or relay limited weather observations		
434. Operate aircraft arresting systems		
435. Operate vehicle traffic control signals		
436. Perform departure control overrides		
437. Plot or relay positions on crash grid maps		
438. Request aircraft releases from departure control		
439. Select appropriate wind sensors		
440. Support minimum interval takeoff operations (MITOs)		
441. Verify proper arresting system configurations		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE AMOUNT
I. PERFORMING MOBILE OPERATIONS		
442. Compute PAR voltages		
443. Conduct ATC mobility training exercises		
444. Conduct deployment briefings		
445. Conduct sight survey training		
446. Conduct site surveys for locating mobile ATCALS		
447. Construct bunkers or revetment walls		
448. Erect or tear down ATC facilities		
449. Erect or tear down cantonment facilities		
450. Erect or tear down communications facilities		
451. Initiate requests for notice of intent to construct mobile facilities		
452. Install communications landlines		
453. Inventory mobile equipment, tools, or supplies		
454. Level mobile radar equipment		
455. Level mobile tower equipment		
456. Load or offload equipment from aircraft or vehicles		
457. Manage dispersed controller programs		
458. Obtain food, lodging, or medical support for mobile teams		
459. Obtain weather information in support of mobile operations		
460. Operate M-series vehicles or associated equipment		
461. Operate site survey equipment		
462. Palletize mobile equipment for airlift		
463. Perform convoy duties		
464. Perform courier duties		
465. Perform operator maintenance on M-series vehicles or associated equipment		
466. Perform user maintenance of site survey equipment		
467. Plan aircraft loading or unloading		
468. Position mobile ATC equipment or support equipment		
469. Prepare mission limiting factors		
470. Prepare mobile functional support kits		
471. Prepare TERPS packages for mobile site development		
472. Process airfield waiver packages		
473. Review operation orders or plans		
474. Set up disaster control facilities		
475. Set up mobile team ground defense facilities		
476. Unpack or repack communications equipment components		
477. Weigh equipment		
J. PERFORMING AIR TRAFFIC CONTROL DATA PROGRAMMER FUNCTIONS		
478. Analyze recorded computer data for aircraft accident or incident investigations		
479. Assemble off-line programs		
480. Assist ATC facility managers in developing operating procedures for automated ATC systems software sites		
481. Assist training sections with implementation of automated scenario problems		
482. Build operational programs		
483. Conduct FAA acceptance testing		

DUTY-TASK SECTION

1. CHECK tasks you perform now.
2. If you DON'T do it, DON'T check it.
3. In the "time spent" column RATE all checked tasks on time spent in present job. If you CHECKED it, RATE it.

	CHECK (✓) IF DONE NOW	TIME SPENT IN PRESENT JOB 1 - VERY SMALL AMOUNT 2 - MUCH BELOW AVERAGE 3 - BELOW AVERAGE 4 - SLIGHTLY BELOW AVERAGE 5 - ABOUT AVERAGE 6 - SLIGHTLY ABOVE AVERAGE 7 - ABOVE AVERAGE 8 - MUCH ABOVE AVERAGE 9 - VERY LARGE
484. Conduct in-house tests for automated ATC systems software		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
485. Conduct or analyze feasibility studies to determine hardware or software needs to support automated ATC systems		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
486. Conduct tests for enroute automated radar tracking system (EARTS) software		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
487. Configure automated ATC systems hardware for operational needs		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
488. Configure EARTS hardware systems for operational needs		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
489. Document and record data for computer programs		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
490. Interpret system performance for air traffic controllers		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
491. Maintain data bases for automated ATC systems		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
492. Maintain data bases for EARTS		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
493. Perform systems analysis to resolve software problems		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
494. Program and assign peripheral devices in data processing subsystems		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
495. Program digitized ATC geographic maps		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
496. Program source codes for software maintenance or operational programs of automated ATC systems		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
497. Program ULTRA-30 language code for software maintenance or operational programs of EARTS mainframe		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
498. Provide joint service or interdepartmental support for automated ATC systems implementations		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
499. Submit recommendations to FAA for software changes		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
500. Sustain EARTS software to meet FAA National Air Space Configuration Management software requirements		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
501. Test software for related computer interfaces		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
502. Validate automated ATC systems software modifications		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
503. Validate EARTS software modifications		① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

RETURN TO THE INSTRUCTIONS FOR COMPLETING THE DUTY-TASK SECTION AND FOLLOW "PROCEDURE B"

APPENDIX G: HIGH PERCENT TIME SPENT (PTS) TASKS WITH TASK FACTOR RANK ORDERS

1) Paygrade Personnel
2) Skill Level Personnel
3) TAFMS Personnel
4) TICF Personnel

Rank Order of Task Factor Ratings for 25 Tasks Personnel Spend the Greatest Amount of Time Performing by Paygrade

E-7/8/9	RANK ORDER			E-4/5/6	RANK ORDER			E-1/2/3	RANK ORDER		
TASKS	TD	TLD	TPD	TASKS	TD	TLD	TPD	TASKS	TD	TLD	TPD
B 96	197	279	237	F298	490	486	494	F298	490	486	494
B 54	116	213	160	F295	500	501	502	F295	500	501	502
A 11	234	295	272	F305	405	374	419	F231	498	502	498
C132	53	65	46	F306	500	501	502	F305	405	374	419
C107	28	92	72	F208	398	437	454	F306	393	388	415
B 88	38	203	142	F280	499	496	496	F208	398	437	454
B 73	176	207	169	F288	499	496	496	F280	499	496	496
C133	32	64	51	F227	491	465	489	F227	491	465	489
B 72	200	202	111	F303	491	465	489	F288	381	358	403
A 20	82	95	79	F220	484	476	483	F228	494	466	487
B 86	50	118	82	F232	484	476	483	F220	331	280	328
C115	93	103	108	F267	502	495	501	F232	484	476	483
C105	39	87	123	F228	494	466	487	F303	489	487	482
C120	149	195	130	F331	350	369	418	F331	350	369	418
C119	96	227	122	F293	493	488	486	F267	502	495	501
C135	17	52	33	F231	498	502	498	F212	312	247	317
F306	393	388	415	F292	498	502	498	F293	493	488	486
C101	37	117	117	F212	498	502	498	F281	466	454	465
F298	490	486	494	F281	466	454	465	F292	497	490	493
F305	405	374	419	F345	402	299	284	F345	420	441	466
F295	500	501	502	F291	428	442	436	F243	360	372	389
A 21	177	215	199	F255	461	459	457	F324	488	491	484
C108	56	144	167	F258	472	446	450	F296	501	498	503
A 1	479	493	481	F296	501	498	503	F258	472	446	450
A 14	151	93	119	F321	185	252	280	F289	426	433	438

Rank Order of Task Factor Ratings for 25 Tasks Experienced Personnel Spend the Greatest Amount of Time Performing

27270	RANK ORDER			27290	RANK ORDER			27200	RANK ORDER		
TASK	TD	TLD	TPD	TASK	TD	TLD	TPD	TASK	TD	TLD	TPD
F298	190	486	494	B 96	197	279	237	B 96	197	279	237
F305	405	374	419	C135	17	52	33	C135	17	52	33
B 86	50	118	82	A 21	177	215	199	A 20	82	95	79
F306	393	388	415	A11	234	295	272	B 71	347	353	309
F295	500	501	502	C132	53	65	46	C101	37	117	117
F303	489	487	482	B 54	116	213	160	B 73	176	207	169
B 96	197	279	237	A 10	137	99	107	B 72	200	202	111
F288	381	358	403	C133	32	64	51	C107	28	92	72
F208	398	437	454	A 34	365	378	321	C132	53	65	46
F280	499	496	496	C119	96	227	122	E205	276	132	220
F227	491	465	489	C120	149	195	130	C133	32	64	51
F220	331	280	328	A 20	82	95	79	A 26	363	361	262
F293	493	488	486	A 14	151	93	119	C105	39	87	123
F292	497	490	493	C115	93	103	108	C108	56	144	167
F232	484	476	483	C126	311	363	230	A 38	48	158	138
F212	312	247	317	B 88	38	203	142	B 54	116	213	160
F228	494	466	487	A 27	259	286	221	A 44	430	469	406
C132	53	65	46	B 86	50	118	82	A43	408	468	409
F345	420	441	466	C107	28	92	72	E200	65	102	109
H432	341	384	353	B 72	200	202	111	I443	192	74	124
F291	428	442	436	B 73	176	207	169	F235	375	419	416
A 2	429	479	758	A 46	453	439	413	A 11	234	295	272
F267	502	495	501	C105	39	87	123	B 88	38	203	142
F281	466	454	465	A 38	48	158	138	C115	93	103	108
F321	185	252	280	E188	84	51	76	C120	149	195	130

Rank Order of Task Factor Ratings for 25 Tasks Senior Air Force Personnel (TAFMS)
Spend the Greatest Amount of Time Performing

97+	RANK ORDER			241+	RANK ORDER		
TASKS	TD	TLD	TPD	TASKS	TD	TLD	TPD
F298	490	486	494	B 96	197	279	237
F306	393	388	415	C135	17	52	33
F305	405	374	419	A 20	82	95	79
F295	500	501	502	C101	37	117	117
F288	381	358	403	B 73	176	207	169
F303	489	487	482	A 11	234	295	272
B 86	50	118	82	B 72	200	202	111
F280	499	496	496	B 71	347	353	309
F208	398	437	454	C107	28	92	72
F227	491	465	489	B 54	116	213	160
F220	331	280	328	C132	53	65	46
F232	484	476	483	C105	39	87	123
B 96	197	279	237	B 88	38	203	142
F293	493	488	486	C133	32	64	51
F228	494	466	487	B 81	2	14	42
F292	497	490	493	B 83	107	165	268
F212	312	247	317	A 14	151	93	119
F281	466	454	465	C119	96	227	122
F267	502	495	501	C115	93	103	108
F291	428	442	436	C108	56	144	167
F345	420	441	466	C120	149	195	130
F331	350	369	418	A 21	177	215	199
B 54	116	213	160	A 38	48	158	138
F255	461	459	457	A 34	365	378	321
F321	185	252	280	A 26	363	361	262

Rank Order of Task Factor Ratings for 25 Tasks Senior Career Field (TICF) Personnel Spend the Greatest Amount of Time Performing

97+	RANK ORDER		
TASKS	TD	TLD	TPD
F298	190	486	494
B 96	197	279	237
F306	393	388	415
F295	500	501	502
F305	405	374	419
B 86	50	118	82
F288	381	358	403
F303	489	487	482
F208	398	437	454
F280	499	496	496
F227	491	465	489
F220	331	280	328
F232	484	476	483
F293	493	488	486
F228	494	466	487
F212	312	247	317
F292	497	490	493
F281	466	454	465
C132	53	65	46
B 54	75	30	60
F291	428	442	436
F267	502	495	501
F345	420	441	466
A 2	429	479	458
F331	350	369	418

APPENDIX H:. HIGH PERCENT MEMBERS PERFORMING (PMP) TASKS WITH TASK FACTOR RANK ORDERS

1) Paygrade Personnel
2) Skill Level Personnel
3) TAFMS Personnel
4) TICF Personnel

Rank Order of Task Factor Ratings for 25 Tasks Performed by the Greatest Percentage of Paygrade Personnel

E-7/8/9		RANK ORDER			E-4/5/6		RANK ORDER			E-1/2/3		RANK ORDER		
PMP	TASK	TD	TLD	TPD	PMP	TASK	TD	TLD	TPD	PMP	TASK	TD	TLD	TPD
75	F306	393	388	415	91	F298	190	486	494	97	F298	190	486	494
74	B 54	116	213	160	91	F305	405	374	419	94	F305	405	374	419
74	F305	405	374	419	91	F280	499	496	496	93	F231	498	502	498
73	B 96	197	279	237	91	F306	393	388	415	93	F288	381	358	403
73	F298	490	486	494	90	F288	381	358	403	92	F306	393	388	415
72	F288	381	358	403	89	F227	491	465	489	92	F280	499	496	496
72	F227	491	465	489	89	F295	500	501	502	92	F295	500	501	502
72	F280	499	496	496	88	F291	428	442	436	90	F227	491	465	489
71	F295	500	501	502	86	F293	493	488	486	89	F208	398	437	454
71	F303	489	487	482	86	F348	482	484	492	89	F348	482	484	492
71	C133	32	64	51	86	F303	489	487	482	88	F293	493	488	486
70	C132	53	65	46	85	F208	398	437	454	88	F228	494	466	487
70	F291	428	442	436	85	F282	474	475	471	88	F282	474	475	471
69	F228	494	466	487	85	F331	350	369	418	87	F291	428	442	436
69	F212	312	247	317	85	F232	484	476	483	87	F212	312	247	317
69	F255	461	459	457	85	F294	503	500	500	86	F331	350	369	418
68	F235	375	419	416	85	F220	331	280	328	86	F220	331	280	328
68	F232	484	476	483	85	F212	312	247	317	84	F232	484	476	483
68	F321	185	252	280	84	F255	461	459	457	84	F294	503	500	500
68	F293	493	488	486	84	F292	497	490	493	84	F343	440	420	437
67	F282	474	475	471	84	F231	498	502	498	83	F303	489	487	482
67	F208	398	437	454	83	F228	494	466	487	83	F289	426	433	438
67	F343	440	420	437	83	F343	440	420	437	82	F255	461	459	457
67	F284	427	387	396	83	F289	426	433	438	82	F296	501	498	503
67	F220	331	280	328	82	F267	502	495	501	82	F321	185	252	280

Rank Order of Task Factor Ratings for 25 Tasks Performed by the Greatest Percentage of Experienced Skill Level Personnel

27270		RANK ORDER			27290		RANK ORDER			27200		RANK ORDER		
PMP	TASK	TD	TLD	TPD	PMP	TASK	TD	TLD	TPD	PMP	TASK	TD	TLD	TPD
86	F305	405	374	419	86	C132	53	65	46	93	B 96	197	279	237
85	F306	393	388	415	84	B 96	197	279	237	80	E205	276	132	220
85	F298	190	486	494	84	A 21	177	215	199	80	C133	32	64	51
85	F288	381	358	403	84	B 54	116	213	160	80	B 54	116	213	160
84	F280	499	496	496	84	C133	32	64	51	80	A44	430	469	406
83	F303	489	487	482	84	A 46	453	439	413	80	A 1	479	793	481
83	F227	491	465	489	81	A 1	381	358	403	73	A 20	82	95	79
81	F295	500	501	502	78	A 11	234	295	272	73	C107	28	92	72
81	F291	428	442	436	78	C119	96	227	122	73	C132	53	65	46
80	F212	312	247	317	78	A 20	82	95	79	73	A 43	408	468	409
80	F232	484	476	483	76	C120	149	195	130	73	A 11	234	295	272
79	F293	493	488	486	76	A 14	151	93	119	73	A 34	365	378	321
79	F208	398	437	454	76	C115	93	103	108	67	B 73	176	207	169
79	F292	497	490	493	76	B 88	38	203	142	67	B 72	200	202	111
79	F282	474	475	471	76	A 27	259	286	221	67	A 26	363	361	262
78	F220	331	280	328	76	E195	282	310	274	67	C105	39	87	123
78	F321	185	252	280	76	B 77	486	494	491	67	E200	65	102	109
78	B 51	487	499	497	73	A 10	137	99	107	67	F235	375	419	416
78	F255	461	459	457	73	A 34	365	378	321	67	B88	38	203	142
78	F343	440	420	437	73	C126	311	363	230	67	B75	143	152	126
78	F348	482	484	492	73	C104	58	86	84	67	E188	84	51	76
77	F284	427	387	396	73	A 3	495	503	499	67	C104	58	86	84
77	F228	494	466	487	73	F306	393	388	415	67	A 3	495	503	499
77	F294	503	500	500	73	F227	491	465	489	67	A 10	137	99	107
75	F289	426	433	438	73	F288	381	358	403	67	C131	4	8	19

Rank Order of Task Factor Ratings for 25 Tasks Performed by the Greatest Percentage of Experienced Air Force Personnel (TAFMS)

97+		RANK ORDER			241+		RANK ORDER		
PMP	TASK	TD	TLD	TPD	PMP	TASK	TD	TLD	TPD
86	F305	405	374	419	82	B 96	197	279	237
86	F306	393	388	415	75	B 54	116	213	160
85	F298	190	486	494	73	C133	32	64	51
85	F288	381	358	403	72	C132	53	65	46
84	F280	499	496	496	68	B 88	38	203	142
84	F227	491	465	489	68	F235	375	419	416
83	F295	500	501	502	68	F288	381	358	403
83	F303	489	487	482	68	F306	393	388	415
82	F291	428	442	436	68	F227	491	465	489
80	F293	493	488	486	67	F305	405	374	419
80	F232	484	476	483	67	F280	499	496	496
79	F208	398	437	454	65	F298	190	486	494
79	F212	312	247	317	65	F282	474	475	471
79	F282	474	475	471	63	A11	234	295	272
79	F220	331	280	328	63	A21	177	215	199
79	F348	482	484	492	63	A 1	479	493	481
79	F255	461	459	457	63	F295	500	501	502
78	F228	494	466	487	63	F212	312	247	317
78	F284	427	387	396	63	F293	493	488	486
77	F321	185	252	280	63	F291	428	442	436
77	F292	497	490	493	63	F284	427	387	396
77	F294	503	500	500	62	B 73	176	207	169
77	F343	440	420	437	62	C119	96	227	122
77	F331	350	369	418	62	F321	185	252	280
76	F289	426	433	438	62	F232	484	476	483

Rank Order of Task Factor Ratings for 25 Tasks Performed by the Greatest Percentage of Senior Career Field (TICF) Personnel

97 +		RANK ORDER		
PMP	TASKS	TD	TLD	TPD
84	F306	393	388	415
84	F305	405	374	419
84	F288	381	358	403
83	F298	190	486	494
83	F227	491	465	489
82	F280	499	496	496
81	F295	500	501	502
81	F303	489	487	482
80	F291	428	442	436
78	F232	484	476	483
78	F293	493	488	486
78	F212	312	247	317
78	F208	398	437	454
78	F220	331	280	328
77	F255	461	459	457
77	F282	474	475	471
77	F348	482	484	492
77	F228	494	466	487
76	F321	185	252	280
76	B51	487	799	497
76	F284	427	387	396
76	F292	497	490	493
75	F343	440	420	437
75	F294	503	500	500
74	F331	350	369	418

APPENDIX I: RANK ORDER OF FACTOR RATINGS OF TASKS RATED HIGH ON TRAINING EMPHASIS AND PERFORMED BY GREATER THAN 50 PERCENT OF FIRST JOB PERSONNEL

TE	1st JOB		RANK ORDER		
M+SD*	PMP	TASKS	TD	TLD	TPD
7.67	93	F288	381	358	403
7.54	86	F289	426	433	438
7.43	55	F286	262	281	375
7.42	88	F212	312	247	317
7.33	86	F321	185	252	280
7.31	72	F243	360	372	389
7.21	89	F208	398	437	454
7.17	87	F220	331	280	328
7.17	87	F292	497	490	493
7.13	50	F347	317	262	367
7.10	81	F284	427	387	396
7.06	83	F281	466	454	465
7.00	79	F240	153	243	168
7.00	69	F272	136	197	171
6.98	88	F331	350	369	418
6.96	90	F291	428	442	436
6.88	91	F293	493	488	486
6.85	95	F305	405	374	419
6.83	93	F306	393	388	415
6.83	75	F238	467	463	452
6.81	68	F222	232	169	242
6.79	91	F227	491	465	489
6.75	72	F242	221	254	231
6.71	72	F329	462	467	472
6.67	90	F282	474	475	471

*3.22+2.27=5.49